SCHOOL FINANCE DECISIONS AND ACADEMIC PERFORMANCE: AN ANALYSIS OF THE IMPACTS OF SCHOOL EXPENDITURES ON STUDENT PERFORMANCE

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Abstract

of

SCHOOL FINANCE DECISIONS AND ACADEMIC PERFORMANCE: AN ANALYSIS OF THE IMPACTS OF SCHOOL EXPENDITURES ON STUDENT PERFORMANCE

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Andrew Edward Carhart

In 2013, California enacted the Local Control Funding Formula (LCFF) and set the most significant change to the state's education system in the past forty years in motion. The LCFF reformed the state's education finance system by reducing categorical funding programs, creating new formula funding mechanisms for students with the most significant needs, and providing flexibility to local decision makers. Since the LCFF has abolished or consolidated a majority of the categorical programs that the Legislature built up over the course of three decades, current administrators will be tested with newfound autonomy. In addition, school districts will be held accountable for their budgetary choices under the LCFF through Local Control and Accountability Plans (LCAPs), which must detail school wide goals, specific actions, performance measures, and expenditure projections to estimate what effect school policies will have on academic achievement.

In this thesis, I use the basis of a regression analysis to provide a framework for rationalizing and prioritizing fiscal decisions and assess what choices can provide the best

academic outcomes for California's schools and students. Using two regression methods—ordinary least squares (OLS) and logistic—I examine the relationships among school, student, and teacher characteristics, test scores, and exemplary school performance using extensive data from primary and secondary schools in the state of Texas. The OLS regression analysis demonstrates a clear relationship between school expenditures in certain functions and average standardized test scores, while controlling for the complex interactions among the many other inputs of the education process. Based on the results of this first OLS analysis, I also perform a separate secondary regression analysis using a logistic regression model that demonstrates there is a non-linear relationship exists between expenditures and exemplary performing schools, with significantly differing effects based on the majority demographic composition of the school.

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Chapter One

INTRODUCTION

> Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principal instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms.
>
> *– Chief Justice Earl Warren*
> *Brown v. Board of Education (347 U.S. 483)*
> *May 17, 1954*

One of the central functions of state and local governments is to provide the governance, structure, and funding for a system for public education. The public generally expects that such systems will be free and universally accessible and provide educational opportunities that not only impart knowledge and foster academic success, but also instill cultural values, cultivate responsible citizenship, create an informed electorate, and prepare the populace with the training and skills required for employment. Unfortunately, the California public education system faces substantial difficulties meeting the needs of its students and its schools are underperforming on many different measures. Though some difficulties are a result of student disadvantages or administrative barriers, one constant criticism of California schools is that the system simply lacks the financial resources to educate students.

Out of the fifty states and the District of Colombia, California's eighth grade test scores ranked seventh to last in math, third to last in reading, and second to last in science (Bryk, Hanushek, & Loeb, 2007). According to Education Week's annual survey, California was second to last in per pupil spending in the nation, at $8,689 spent per student in 2010-11. The state's

spending was far less than the national average of $10,826 per student in this ranking, although rankings may vary depending on the fund sources and methodologies used (Fensterwald, 2014). As the state responds with new laws and policies and revenues grow from economic expansion, these figures are gradually changing. In 2011-12, California's expenditures rose to $9,053 per student, which placed it $1,781 below the national average, at rank 39 among the fifty states and the District of Colombia (Fensterwald, Report: State no longer at bottom in spending, 2015). It is clear that the state is taking action to increase funding to the K-12 education system. However, what is not clear is if an influx of money alone will improve students' educational outcomes.

Although the types of curriculum, the quality of teachers, and the effectiveness of administrators have a significant influence on expected academic outcomes, the amount of money spent on students and the mechanisms that finance public education systems also have a strong effect on academic success. Increasing school resources can contribute to such factors as teacher quality, administrative capacity, student resources, and facility investments, which all have the potential to greatly affect student achievement. But the structure of a school finance system may also play a part in increasing academic achievement. For example, a finance system that fails to provide adequate teacher salaries may result in reduced teacher quality, as more experienced educators may leave relatively low paying jobs for better prospects with higher compensation. On the other hand, a system that provides overly generous salaries and benefits for teachers may fail to invest in facilities such as classrooms, auditoriums, or computer labs, which may put students at a disadvantage and stifle learning opportunities. Though the amount of resources spent on education matters, the ways in which finance systems allocate those resources also play an important role in promoting or impeding academic achievement.

Since the structure of school finance systems plays such a vital role in academic outcomes, legislation and propositions that seek to rewrite educational finance mechanisms are

frequently brought forth to solve a wide variety of problems in the state's school systems. On July 1, 2013, Governor Jerry Brown signed Assembly Bill (AB) 97 into law, which enacted the Local Control Funding Formula (LCFF)—the state's latest effort to reform the education finance system and produce more efficient educational processes and better academic outcomes. The LCFF takes effect over the course of eight years and represents the most significant change to California's education finance system in the past forty years (California Department of Education, 2015 a). Though the law will take some time to truly have an impact on California's students, many interested observers from government agencies, media outlets, public interest groups, and a host of other affected areas will be watching closely to determine the effectiveness of these changes.

As a result of this major policy change, in this study I examine the effects of school-level financial decisions on academic achievement using regression analyses. I intend that this study will provide an appropriate context to guide the decisions that school administrators face under the LCFF by estimating the real effects of financial decisions on academic test scores. In the following sections, I begin this analysis by providing a brief history of education finance reform in California before outlining some of the major challenges that local authorities face under the new LCFF model.

California has a Long History with Complex Education Finance Systems

When California's first state legislature enacted statutes in 1851 to implement the requirements of the original California constitution, the law required school districts to collect at least one-third of the money required to operate the district's schools in order to receive funding for the remaining costs from the state government (Picus, 1991). Over time, California's schools have been forced to adapt to a growing population, expanding educational infrastructure and

administration, and the increasing complexity of school budgets. As is the case in many other states, California's early system of education finance has since developed to use formulas that distribute funding throughout the system (Federal Education Budget Project, 2014). However, the state's long history with such formulas has not always been a success. Before the enactment of the LCFF, state Senator Joe Simitian labeled California's record of education legislation, initiatives, and litigation a "Winchester Mystery House" of school finance (Schrag, 2012). Piecemeal reforms built up over the years and created unintended consequences with no clear purpose. The goal of the LCFF was to replace that patchwork of laws with a simplified system based on local demographics that provided the flexibility for schools to use funds as necessary to improve student outcomes (California Department of Education, 2015 a).

Whether through formulas or other methods, education budgets direct over $76 billion to California schools (California Department of Education, 2015 a) and over $550 billion of the federal budget (Federal Education Budget Project, 2014) into K-12 education systems. With such large amounts of money at stake, government entities, voters, parents, administrators, educators, and many other groups naturally expect the education system to produce positive outcomes. On top of this, the effects of primary and secondary education ripple outward into students' lives as they seek higher education, pursue future opportunities in employment, and participate in a democratic government. When laws create formula-driven finance systems that fail to accurately account for the true costs of education, improper allocations can leave disadvantaged students with little opportunity for success. That is why the connection between inadequate school resources and unequal student outcomes has led to intense conflicts and extensive litigation in most states for more equitable distributions of school resources (Federal Education Budget Project, 2014).

Litigants Sought to Redress Inequities in Education Finances through the State and National Court System

The disparities in education finance were not always as apparent to the general public as they are in hindsight today. Following the passage of the Civil Rights Act in 1964, the publication of *Equality of Educational Opportunity* (Campbell, et al., 1966), also known as "the Coleman report", brought some of the first national attention on the real disparity of education in the south. The report contained extensive survey data and used a regression analysis to detail the contrast in academic outcomes between White and African-American students. In the years that followed this report, Arthur Wise's publication of *Rich Schools Poor Schools: The Promise of Equal Educational Opportunity* (1969) laid the groundwork for the first wave of legal challenges to public education systems across the United States. Wise reasoned that systems with unequal distributions of resources violated the equal protection clause of the Fourteenth Amendment to the federal constitution and many litigants took to the court system to seek a resolution to their disputes (Rebell, 2002). This legal challenge took shape in California beginning in 1968 through the case of *Serrano v. Priest*.

The California Supreme Court's resulting decision in 1971 (Serrano I) established that the inequalities of the state's education system violated the equal protection of the laws guaranteed in both the state and federal constitutions and, as a result, the court remanded the matter back to the appellate court for further trial (Rebell, 2002). The final judgment forced the legislature to create a plan to reduce funding gaps throughout the state (Ardon, Brunner, & Sonstelie, 2000). In 1973, this legislative plan took effect through legislation that addressed the court's decision by increasing guaranteed state funding for primary and secondary schools, adding a revenue limit to control growth in assessed property values, and reduced school boards' authority to levy permissive tax overrides without a vote (Property Tax Relief Act, 1972). The

law also specifically called out appropriation of some funds for "categorical" programs by earmarking monies for specific programs such as educationally disadvantaged youth, districts with high percentages of family poverty, bilingual students, pupil transiency, K-3 education reforms, and early childhood education (Picus, 1991).

Only two years later, in the 1973 case *San Antonio Independent School District v. Rodriguez*, the United States Supreme Court found that the federal constitution did not guarantee education as a fundamental right and that the equal protection clause did not apply in cases of financial inequity (Rebell, 2002). As a result of this decision, the California Supreme Court reconsidered and reaffirmed its prior ruling in 1976 (Serrano II) under the justification that the state constitution's equal protection clause still applied to the education finance disparities, even if the federal constitution did not guarantee equal educational opportunities (Ardon, Brunner, & Sonstelie, 2000). The court required the state to bring the disparities in per-pupil across districts down to no more than $100 by 1980 (Rebell, 2002). However, in both the *Serrano I* and *Serrano II* decisions, the court adopted a doctrine described as "fiscal neutrality," which revolved around equalizing funding across districts (Rebell, 2002).

Following the *Serrano II* decision, Governor Jerry Brown signed AB 65 into law in 1977 to fulfill the mandate to equalize district funding levels. The bill would have taken effect in 1978 to transfer funding from affluent districts to those with lower property tax revenue, but the passage of Proposition 13 preempted its implementation (Hirji, 1998). Though the approval of Proposition 13 was only the first of a series of initiatives to rewrite the rules of the state's revenue collection, appropriation, and budget processes, over twenty years of litigation came to a close in 1986 with the *Serrano III* decision. In the final legal challenge in this case (Serrano III), the court ruled that the state's success in bringing 93 percent of districts within $100 of each other satisfied the requirements of the 1976 *Serrano II* decision.

Direct Democracy Finance Reforms Often Created Unintended Consequences

When Proposition 13 took effect in 1978, its changes to California's property tax drastically restructured the mechanisms that generated local government revenues. The measure reduced assessed property values to their 1975 levels, capped the tax at 1 percent of the property's value, limited annual property tax increases to an inflationary value of no more than 2 percent per year, restricted reassessments to property transfers, and required local votes to reach a two-thirds majority to increase special taxes (Cal. Const. art. XIII A).However, Proposition 13 also had many unintended consequences on education finances as well. In 1979, the legislature passed AB 8, which created the post-Proposition 13 state-driven property tax allocation system and established the revenue limit finance mechanism for local school districts (Assembly Bill 8, Cal. Stat. 1979, Ch. 282, 959-1059). Local agencies, including school districts, began receiving a percentage of the property tax as a share of what they received prior to Proposition 13. With the two-thirds majority requirement to raise taxes and the 1 percent cap on the property tax, local governments lost much of their autonomy to raise revenues through any means other than economic development activities, which would still only return a share of the increased tax revenue to the local area (Chapman, 1998)

In the decades following Proposition 13, California voters approved three other major voter initiatives—Proposition 4 (1979), Proposition 98 (1988), and Proposition 111 (1990)—that radically redefined the state's process in creating education budgets. In 1979, voters passed Proposition 4, which created a state appropriations limit. The cap on annual state and local government appropriations became known as the "Gann Limit", after the measure's sponsor (Limitation of government appropriations. California Proposition 4, 1978). Beginning in 1981, the appropriations limit prevented state and local governments from appropriating money that exceeded the baseline prior fiscal year's appropriation, after adjustment for cost-of-living and

population changes. This limit did not apply for certain exempt purposes (e.g., subvention from state to local government, debt service on pre-Proposition 4 appropriations, payment for compliance with federal law or court mandates) and voters could approve an increase in the limit for a period of up to four years (Cal. Const. art. XIII B). As a result of the Gann limit, if state or local governments collect revenues in excess of the appropriation cap, the funds must either be appropriated for an exempt purpose or the excess revenues would be returned directly to taxpayers through a tax refund. Though revenue growth in the years following the passage of Proposition 4 was initially below the appropriations limit, the state took in unexpectedly large revenues in the 1986-87 fiscal year due to the passage of the federal Tax Reform Act of 1986, which resulted in a $1.1 billion refund to California taxpayers (Assembly Committee on Revenue and Taxation, 2011).

In 1988, voters approved Proposition 98, which established a minimum guaranteed level of funding for K-12 and community college education that was intended to keep pace with increasing school attendance and economic growth. Proposition 98 provides three "tests" to determine the amount of the minimum guarantee:

- Test 1 - The state must provide a minimum baseline of at least 39 percent of General Fund revenues.
- Test 2 – If General Fund revenues grow faster than personal incomes, then the minimum guarantee must increases the prior-year's funding by both growth in attendance and per capita personal income.
- Test 3 – If General Fund revenues grow slower than personal incomes, then the minimum guarantee must increases the prior-year's funding by both growth in attendance and per capita General Fund revenues.

The Legislature may also suspend the minimum guarantee and set any level of education funding for one year with a two-thirds majority vote (Manwaring, 2005). However, in years where test 3 applies or the Legislature suspends the guarantee, the gap in funding between the existing minimum guarantee and the lower budgeted amount—known as the "maintenance factor"—must be restored in future years:

[FIGURE 1]

As the figure above shows, a reduction in education budgets in year one must be incrementally restored in the following years until the allocated money is equivalent to what would have been spent following the regular growth of the minimum guarantee. For example, if the Legislature votes to reduce education spending in year 1 by $2 billion, the state must then provide an additional allotment in each following year until the maintenance factor is repaid. The state's education spending then reaches the level that would have existed, had the legislature taken no action, with a net savings throughout the years (Manwaring, 2005). In addition to establishing the funding guarantee, Proposition 98 also modified the state appropriations limit to stipulate that any excess revenue collected must be redirected to provide at least 4 percent of the minimum school funding guarantee before the remaining amount is refunded to the state's taxpayers (Classroom Instructional Improvement and Accountability Act. California Proposition 98, 1988). This change signaled the increasing importance placed on preserving the state's education budgets and maintaining a guaranteed level of funding even throughout poor economic times.

The enactment of Proposition 111 in 1990 brought about much more substantial changes in the appropriations limit, which were applied retroactively back to the 1986-87 state fiscal year. Prior to its passage, the change in the annual spending limit was calculated using the lesser of the United States Consumer Price Index or per capita personal income growth and relied solely on statewide population growth. This measure revised the annual changes in the spending limit to

factor in a weighted average of the population growth and K-14 school enrollment changes and to only use the growth in per capita personal incomes (Traffic Congestion Relief and Spending Limitation Act. California Proposition 111, 1990). Proposition 111 made capital outlay spending, appropriations from increased gas taxes, and appropriations from natural disasters exempt from the spending limit. It also changed the calculation of excess revenues and refunds to a two-year cycle and required refunds to be split equally between taxpayers and Proposition 98 funding (Classroom Instructional Improvement and Accountability Act. California Proposition 98, 1988). Without the changes from Proposition 111, the state's annual spending limit would have been approximately $6 billion less in the 1999-2000 fiscal year and lawmakers would have more commonly encountered years with excess revenues and potential tax refunds (Legislative Analyst's Office, 2000).

The State Legislature Increasingly Relied on Categorical Programs to Direct Limited State Education Funds to Targeted Policy Prescriptions

Between the Legislature's response to the Serrano decisions in 1973 and the enactment of the LCFF in 2014, California established many different categorical funding streams to earmark funds for specific purposes. Some of these programs covered such narrow program areas as civic education, Exit Exam tutoring, oral health assessments, and student councils. Other programs were set out to address much broader policy goals, such as staff development or special education (Local Control Funding Formula, 2013). However, among these programs, one particularly popular appropriation set aside a large share of the entire education budget in an attempt to reverse declining student achievement in the early 1990s.

Under Governor Pete Wilson's administration, the state created one of the most ambitious and expensive targeted funding programs to reduce class sizes in 1996. The class size

reduction program was intended to be a voluntary method for school districts to lower their student-teacher ratio in K-3 classes down to at least 20 students per teacher, which would presumably lead to long-term improvement in students' academic performance (California Department of Education, 2015 b). In the 1996-97 state fiscal year, this program accounted for $1 billion of the state's education expenditures, at a total cost of approximately 4 percent of the total $26 billion K-12 education budget. The program grew to over 5 percent of the $29 billion education budget in 1997-98, with an annual cost of about $1.5 billion (Legislative Analyst's Office, 1997).

In total, from 1996 to 2009, more than $25 billion was directed to the state's elementary schools as part of the class size reduction program (Freedberg, 2012). The program provided facility investments for new teaching positions and a monetary subsidy for classes taught by a certified teacher that stayed below an average daily attendance of 20.4 pupils. Prior to the implementation of this program, California schools had the 48th largest student-teacher ratio (California Department of Education, 2015 b). The state embarked on this expensive effort to increase academic outcomes amid a budget surplus in the mid-nineties and promising results from the pilot Student Teacher Academic Ratio (STAR) study in Tennessee. By 2009, the class size reduction program had essentially come to an end from the deepening recession, as the state agreed to provide 70 percent of the program's subsidy to schools with class sizes greater than 25 students (Freedberg, Class size reduction program continues to unravel, 2012). Though the results of the Tennessee STAR study initially showed potential, the California's evaluation of the benefits of class size reduction on student academic performance was inconclusive. Researchers observed gains in student achievement over the first 5 years of implementation, but could not link those gains back to the reduction in class sizes (Bohrnstedt & Stecher, 2002).

The end result of this history of litigation, property tax restrictions, and allocation caps was an overall decline in expenditures relative to other states, as California's per-pupil spending dropped from 5th in the nation in 1965 down to 42nd by 1995 (Rebell, 2002) and 49th by 2011. The tables below show the full extent of California's decline in per-pupil spending relative to the others states and the District of Colombia:

[TABLE 1]

[TABLE 2]

In fact, these comparisons may actually understate the relative decline of per-pupil expenditures, since these data are not adjusted for geographical areas. A dollar spent in a high cost of living state, such as California, does not go as far as a dollar spent in a lower cost of living state, like South Dakota. While these two states appear to be in close proximity in per-pupil expenditures, similar expenditures in South Dakota are able buy more educational value (Kaplan, 2015). Still, under any measure, California clearly lagged the rest of the nation for many years in providing appropriate financial resources to its students.

Many Questions Remain About the State's Future Under the LCFF

By 2013, the state had created 46 total categorical programs to direct funds to various policy priorities. The LCFF eliminated or consolidated 32 of these programs and retains only 14 programs, as listed in the table below:

[TABLE 3]

As the LCFF phases into effect over the course of the next eight years, school districts will be primarily funded using a formula based on the average daily attendance, with supplemental funding for English Language Learners (EL), low-income students (LI) and foster youth. On top of this funding, the LCFF provides additional funds for schools or districts that have high

concentrations of EL, LI, and foster youth populations. However, the LCFF also continues to emphasize class size reduction with a K-3 grade span adjustment, which provides an additional grant of funds to districts that maintain or make progress towards achieving a ratio of 24 students or less per teacher (Cal. Ed. Code § 42238.02). This restructuring is a major policy shift that drastically changes the way California's schools receive state funds and represents the culmination of decades of research on school funding mechanisms (Cabral & Chu, 2013). Many questions still exist about the potential long-term effects of this change and the ways in which school districts will be held accountable for their new funding flexibility, this policy change has the potential to improve academic outcomes throughout California by targeting the populations that are most in need of additional funding.

Since the LCFF has abolished or consolidated most categorical restrictions that California's legislature built up over the course of three decades, current administrators will be tested with a new level of flexibility and autonomy. Under the LCFF, government agencies and the public will hold school districts accountable for their budgetary choices through Local Control and Accountability Plans (LCAPs). By law, the LCAP must detail school wide goals, specific actions, performance measures, and expenditure projections to estimate what effect school policies will have on academic achievement.

Conclusion

In this paper, I use the basis of a regression analysis to provide a framework for budgetary decisions and assess what financial choices can provide the best academic outcomes for California's schools and students. This approach will inform both the budgetary decision making process and the creation of detailed LCAPs. In the next chapter, I address the currently available research on education finance and academic success to provide the basis for the

quantitative analysis. In the third chapter, I detail the methods and data that I used in the regression analysis. In the fourth chapter, I address the results of the regression analysis by presenting the quantitative analysis of school characteristics to determine the expected magnitude of their effects on academic outcomes. In this area, I isolated the items that are under the control of school administrators (such as class sizes, extracurricular activities, or teacher credentials) to determine which choices provide the greatest magnitude of benefits to students' academic achievement, as measured through standardized test results. Building on this analysis, the fifth chapter of this paper addresses the creation of LCAPs using the evidence collected from the regression analysis. I identify the available policy options and analyze how education agencies can create a well-supported plan using an evidenced based approach.

Chapter Two

LITERATURE REVIEW

> A complicated system of financing education benefits no one – not the children whose learning needs often have little to do with spending formulas, not the educators who divert their attention from the classroom to attend to administering and tracking multiple funding streams; not the policy makers who want to address current needs but find their hands tied by historical patterns of spending; and not the taxpayers who demand answers and results but instead get confusion and excuses.
>
> *–Richard R. Tezerian, Chairman*
> *Little Hoover Commission*
> *July 10, 1997*

Each year, the United States spends around 13 percent of all government expenditures on the American public education system (The World Bank, 2015). In California, the K-12 education system alone accounts for $50.5 billion in direct expenditures—almost one-third of the state's $167.6 billion total budgeted expenditures for 2015-16 (California Department of Finance, 2015). With such a large amount of funding dedicated to education, researchers have rightly focused on determining how much education expenditures affect academic performance. In this chapter, I review the literature on education spending and its effects on student achievement in order to provide a background for the following regression analysis. I begin by examining the evolution and use of econometric models like the education production function that researchers have used to measure the effectiveness of financial inputs on academic performance. I then review the current research on the effectiveness of increased funding and the most efficient allocation of those resources on student achievement. I conclude by providing an estimation of the expected magnitudes of the effect of funding decisions.

Education Production Function are the Most Common Econometric Model Used to Analyze Education Inputs and Outputs

Economic theory provides many mathematically derived tools like supply and demand curves, production possibility frontiers, and input-output functions to estimate the behavior of firms in a free market and their optimal levels of production, but government provided goods like police protection, public hospitals, or primary and secondary education systems do not fit neatly into these traditional economic models. Public goods have two theoretical characteristics that separate them from private goods and complicate their analysis: (1) public goods are non-competitive, meaning that an individual can benefit from the good without reducing any other individual's ability to benefit, and (2) public goods are non-excludable, meaning that the provider cannot exclude individuals from benefitting from the good even if they have not paid for it (Tiebout, 1956). In general, this means that there is a "free-rider problem" when a private firm supplies a public good because individuals may benefit from the good without paying for it.

In theory, a private market will under produce a public good in the long run, since a private entity cannot force individuals who consume the good to pay for it (Hanushek, 2002). As a result, government entities generally step in to supply public goods; the government can tax the individuals that benefit from the good to consistently supply it and completely avoid the free-rider problem (Tiebout, 1956). However, government entities must still have a method to determine how much of the public good to produce through some mechanism outside of the supply and demand driven market structure. This leads to another major problem, assuming that consumers to want to get the most benefit for the least cost. If consumers will understate their preference for a public good in order to get more benefits for a lower cost, how can consumers be forced to reveal their true preference for the good?

Charles Tiebout presented a solution to this public good supply issue in *A Pure Theory of Local Expenditures* (1956). He argued that governments may view local expenditures as input-output functions, where a given set of inputs (e.g., money, facilities, and staff) produces an outcome (e.g., reduced crime, increased public health, or educated citizens) according to a mathematically calculated formula. Tiebout believed that governments could find a method to estimate consumers' preferences for local services, if a particular series of assumptions held. If consumers have perfect mobility, a large variety of municipalities are available, and these municipalities supply different levels of public goods with different expenditures and tax levels, then consumers will reveal their preferences for the optimal level of services, expenditures, and taxes by moving to the municipalities that best supply the public goods at their preferred level.

Tiebout acknowledged that such assumptions would not necessarily provide a perfect picture of reality—given the cost of moving, the limited availability of municipalities, and consumers' imperfect knowledge of different expenditure levels—and that the results of such a study would not give an exact mathematical model. Still, Tiebout recognized that the simple supply and demand models traditionally applied to business decisions by firms failed to provide answers and that researchers could, in theory, develop mathematical functions to reveal consumers' preferences and determine the optimal level of local expenditures on public goods. His work provided the foundation for future economic studies and set the stage for the development of more specific mathematical models that better explained the provision of public goods. These ideas became critically important in education studies of the 1960s, as the pressure for equal rights forced changes across American school systems.

The Coleman Report Sparked a Great Debate on the Relationship of School Spending to Student Outcomes

After the passage of the Civil Rights Act in 1964, the federal government commissioned a group of researchers, led by sociologist Samuel Coleman, to prepare a report for the United States Department of Health, Education, and Welfare on the education opportunities of African American students (Baker, 2012). The researchers collected survey data from over half a million schoolchildren in more than 3,000 schools on many different characteristics of the American education system (Campbell, et al., 1966). Coleman used these data in a mathematical production function in the subsequent report, which gave a quantitative output of students' expected education performance based on their race, color, religion, or national origin.

Although this report proposed that the effects of schools on academic achievement was relatively small in contrast to students' backgrounds (Campbell, et al., 1966), researchers have revisited his work and parsed this data using many different advanced statistical methods to find contradictory results on school impacts, which have undermined Coleman's original conclusions (Baker, 2012). Though the accuracy of the analysis may not have been perfect, Coleman's work served an important historical purpose by providing a voluminous survey dataset on school characteristics for future research, introducing quantitative analysis methods to the general public, and starting a long-running debate about the true effects of school resources on academic performance (Hanushek, 1979).

The Colman report was notable not only for its scope, which greatly exceeded any existing body of American education data, but also because it brought new terminology and methods to the attention of the American public for the first time; ideas such as statistical significance, multicollinearity, and simultaneous equations became part of the general conversation about the effectiveness of schools (Hanushek, 1986). These types of studies took on

greater importance as courts, legislatures, and executive branch agencies increasingly relied on regression-based analyses to support legal decisions, create laws and policies, and structure education funding systems (Hanushek, 1979). However, opposing viewpoints developed regarding the real effects of funding variations on student achievement.

In a meta-analysis of education finance related regression studies produced after the Coleman report, Hanushek (1986) claimed to find little or no causal relationship between variation in funding and student outcomes. In order to support this claim, Hanushek conducted an exhaustive review of available publications that used regression analyses based on the concept of the education production function. Out of these publications, he found 187 studies that he determined to be qualified for inclusion, which he defined as analyses that were published in a book or peer-reviewed journal, compared objective measures of student outcomes to family or school characteristics, and provided information about the statistical significance of the relationships. In this case, a single publication could appear as multiple studies in Hanushek's meta-analysis, if the publication reported several regression results for various input factors.

Hanushek arrayed the 187 studies along seven resource-based dimensions: Teacher/pupil ratio, teacher education, teacher experience, teacher salary, expenditures per pupil, administrative inputs, and facilities. According to his tabulation (reproduced in full below), the majority of the reviewed studies found these factors to be statistically insignificant, although he noted that the stronger positive relationship of teacher experience stood out from the remainder of the results.

[TABLE 4]

Hanushek's basic argument in this case was that schools were not effectively allocating their expenditures and, therefore, judicial, legislative, and executive agency discussion of expenditures was an inappropriate way to improve student outcomes. He concludes that increasing expenditures on class size reductions or teacher salaries would not increase student performance

and that research should instead focus on the apparent waste of resources and increasing the efficiency of school operations. However, Hanushek's conclusions were not without challenges.

Greenwald, Hedges, and Laine (1994) responded directly to Hanushek's analysis to refute the conclusion that money does not have an effect on student performance. In their reevaluation of Hanushek's meta-analysis, the researchers raised issues with Hanushek's data and methodology. In reviewing Hanushek's source data, the researchers raised concerns with the age of the data and the methods of sampling. In most cases, Hanushek's sources were cross-sectional samples, which Greenwald, Hedges, and Laine explain are less robust than conclusions drawn from longitudinal data when examining school effects. The researchers also cited the potential implications of publication bias, as studies with no significant effect likely remain unpublished. According to Greenwald, Hedges, and Laine, the vote counting method that Hanushek employed was also flawed, as it is unable to demonstrate the magnitude of effect in the included studies and had significant mathematical problems. As they explain, an increasing number of studies will drive the probability that vote counting will correctly detect an effect towards zero.

Greenwald, Hedges, and Laine applied a variety of different models to the same data set to test the hypothesis that money had no effect. Although they cautioned that the data set used was not sufficient to demonstrate the magnitude of the relationship between school resources and academic outcomes, they concluded that there were demonstrable positive effects of increased resources based on their reanalysis. In Hanushek's (1996) rebuttal to Greenwald, Hedges, and Laine conceded that almost all education researchers would agree that some schools use resources more efficiently than others. As a result, Hanushek noted that their conclusion that money does matter in some circumstances is not surprising, but he suggested that a more pertinent investigation would focus on describing how school resources are used effectively.

Hanushek and Greenwald, Hedges, and Laine continued on to conduct separate meta-analyses using more recently updated data sets. Hanushek again found similar results using the same vote counting method in an analysis of 377 studies published up through 1994, while Greenwald, Hedges, and Laine (1996) assembled a composite data set using the information from Hanushek's original study, the results of database searches, and materials cited in these studies. Greenwald, Hedges, and Laine examined these studies using two methods: combined significance testing and effect of magnitude estimation. Using the combined significance test, the researchers found that there was evidence of a positive effect for each of the resource variables (per-pupil expenditures; teacher ability, education, experience, and salary; teacher/pupil ratio; and school size) and that there was also a potential evidence of negative effects for teacher education, teacher/pupil ratio, and school size. After measuring the full sample, the researchers attempted to account for publication bias, considering that studies that showed no effect were less likely to be published than studies that showed an effect. Their effect of magnitude estimation results suggested that teacher education, teacher experience, and per-pupil expenditures had the most significant effects of the five of the measured school resource inputs with a confirmed positive magnitude.

[TABLE 5]

Though the Specific Relationships are not Clear, Financial Resources Affect Academic Achievement

Hanushek, Greenwald, Hedges, and Laine were not the only education researchers to compile such large scale meta-analyses. King and MacPhail-Wilcox (1986) also produced an analysis that evaluated the results of several decades of education production function studies. While King and MacPhail-Wilcox's review of the literature focused only on the effects of

teacher characteristics on student outcomes, their results also contradicted Hanushek's assentation that money had no effect on student outcomes. Their research found positive associations between student achievement and four teacher characteristics that were directly related to school expenditures: teacher's verbal achievement scores, length of experience, salary, and professional development. However, King and MacPhail-Wilcox's analysis did not attempt to estimate the magnitude of these effects in the way that Greenwald, Hedges, and Laine (1996) had.

Ferguson's (1991) study more directly addressed the question of whether or not financial resources directly affected student achievement. Using data from the 1986 Texas Examination of Current Administrators and Teachers (TECAT) and the following biennial Texas Education Assessment of Minimum Skills (TEAMS) student tests, Ferguson prepared a regression analysis covering more than 2.4 million students across 900 of Texas' 1063 school districts. Ferguson compared the results of the TECAT against student outcomes on the TEAMS tests on a district-by-district basis. Ferguson's regression variables included the school district characteristics, including average income, adult education level, poverty rates in households with children, the percentage of female-headed households, and the percent of households in which English is the second language. After controlling for the demographic effects, Ferguson's analysis concluded that TECAT scores and years of teaching experience were the largest factors affecting student test scores that could be controlled by state policies. The results demonstrated that almost one-quarter of the variation in TEAMS scores could be explained by the combination of TECAT scores and years of experience. Ferguson also identified that elementary school class sizes had a significant effect on student achievement at sizes of 18 or less students. However, this effect did not carry into middle and high school classes.

Other researchers also sought to explain the apparent inconsistences in the relationship between school resources and student outcomes. A group of education researchers (Alfano, et al.,

1994) attempted to demonstrate the relationship between financial inputs and student achievement using what they describe as an input-throughput-output analysis, rather than the traditional input-output model described in an education production functions. As they explain, the traditional input-output analysis fails to explain the relationship between school financial resources and student achievement for three reasons: exogenous student characteristics, school variation, and inconsistent research models.

On the first problem, the researchers theorize that an increasing number of students who come to schools unprepared for education due to poverty, language barriers, failing community systems and dysfunctional families leads to reduced achievement regardless of any school effects. In the second case, the researchers argue that studies cannot relate financial inputs to outcomes because there is no universal standard of measurement for achievement, given the variation in curriculum and testing. They also present the problem that schools cannot appropriately track or measure which funds are allocated to which inputs. The researchers also present a third problem in the research design, as many studies measure different variables. Since there is no universal standard model of an input-output relationship, comparison between studies that use different models would fail to account for these variations.

In order to overcome these difficulties, the researchers instead developed a model that could describe school efficiency and productivity. The table below provides a description of the variables provided in the full model.

[TABLE 6]

The researchers defined efficiency as the ratio of the direct student costs (functions d and e) to the overall school operating cost and productivity as the ratio between operating costs and the academic outcomes. To test this model, the researchers selected a group of 84 New York City high schools and placed them into six homogenous clusters based on their socio-economic status

(SES). Using this sample and the accumulated data from their model, the researchers performed a simple liner regression. The regression analysis showed that the SES clusters accounted for variation of about 190 points in student's SAT scores, while each dollar spent per-pupil on instructional costs (function e) led to a 0.18 increase in SAT scores. That meant that a $1000 increase in instructional costs per pupil would be expected to produce a 180-point increase in SAT test scores.

King and Verstegen's (1998) review of education production function research finds similar trends that demonstrate positive associations between school resources and student outcomes. In their summary of studies related to teachers' characteristics and student outcomes, King and Verstegen provide that 24 of 30 studies showed a positive relationship with years of teaching experience, 17 of 19 studies found a positive relationship with teachers' salaries, and 12 of 15 studies found a positive association with teacher's verbal ability. King and Verstegen also found that reduced class sizes had a positive relationship with student outcomes in 24 of 29 studies and expenditures per pupil had a positive relationship in 12 of 18 studies. As with other reviews, these findings directly contradicted the apparent lack of relationship that Hanushek had previously identified.

Baker's (2012) more recent work attempted to finally put to rest the debate on whether education spending has any relationship to student outcomes. According to Baker's research, the preponderance of finance studies assert that there is a direct positive relationship between increasing financial resources and student outcomes. Card and Payne's (2002) national study of spending inequality found evidence that equalization of spending levels resulted in reduced inequality in test scores across family background groups. Deke's (2003) research on Kansas' attempts to level funding upwards found that a 20 percent increase in spending led to a 5 percent increase in students who attended postsecondary education institutions. Figlio's (2004) research

helped to show the flaws in older studies that looked at comparisons among states. Instead, Figlio showed that using longitudinal data to demonstrate comparisons within a state's districts or schools over time did show the positive impacts of increased spending. Roy's (2003) analysis of Michigan's school finance reforms showed that the state was successful in reducing inequality between school districts and that there was a significant resulting increase in test scores in the previously lowest spending districts. Baker finally concludes that the preponderance of the evidence shows "not only does money matter, but reforms that determine how money is distributed matter too."

Conclusion

Though there has been much debate on how financial resources affect student outcomes, it seems clear that the amount of funding a school receives is linked to its student's academic achievement in many different ways. School finances affect teacher quality directly by providing salaries, which are in turn used to pay for teachers with more years of experience, better verbal aptitude, and greater education. Increasing funds can pay for more teachers, which leads to reduced class sizes that offer more time for one-on-one instruction. Education sector spending also pays for facilities, instructional materials, extracurricular activities, and the overhead cost of school administration.

While the literature may be unclear on the specific variables with the greatest relative effect and the specific magnitude of effects, there is a general consensus that financial resources are one of the key factors in determining student outcomes. In general, most of the studies that I have reviewed include three general categories of financial decisions that are expected to directly affect student outcomes: Classroom instruction, school administration, and educational materials or facilities. However, it is also clear that SES and other exogenous characteristics do play a large

part in academic achievement and that these factors must be included in the education production function to control for their effects.

Chapter Three

METHODOLOGY

Regression analysis allows researchers to describe complex production functions where many input variables interact to impact an output. In education, production functions include a host of input variables that measure student, school, and teacher characteristics and control for confounding variables to estimate the true relationship of the inputs and outputs. However, there are many problems that can occur when specifying education production functions. In this chapter, I first describe common problems associated with the selection of variables and the interpretation of regression analysis results. I then specify the steps that I take to minimize errors and accurately report results. I close this chapter with a list of the variables I selected to include in the regression model, the expected magnitude and direction of effect of each variable, and a model of the causal relationships expected to exist between the variables.

Limited Variation in Inputs

One of the major problems that prevents accurate measurement of an education production function is a lack of variation in the educational inputs. Since many schools throughout the nation tend to use the same classroom structures with similar class sizes and education funds tend to be spent in approximately the same amounts on the same types of expenditures, it is important to ensure there is enough variation in the data to base a regression analysis on (Hanushek, 1986). In many cases, even when there is a difference in school policies, organizational structures, or expenditures, the difference can be relatively small in magnitude. This small variance leads to large problems in estimating the results of education expenditures, as illustrated in the following example:

> Throwing a bucket of water on a raging fire will not keep a building from burning to the ground, but no one would argue on the basis of this experience that water has no value in firefighting. The value of water is apparent only when enough is applied to overcome the fire. An analogous situation often occurs in education. (Fortune & O'Neil, 1994, p. 23)

According to this logic, differences as small as one dollar will not cause any distinguishable effect on academic achievement. A single dollar cannot buy an additional classroom, teacher, desk, or textbook. Although it is difficult to place an exact threshold on such effects, such effects are only likely to be clear at much higher variations, which some researchers estimate toe be in the magnitude of several hundreds of dollars (Fortune & O'Neil, 1994). Although I do not know the exact amount of these thresholds on the variables in my regression, I reviewed the descriptive statistics of my data and ensured that there is significant variation in the expenditure data included in the regression model by reviewing histograms of the expenditure data.

Production of Multiple Outputs

Although regression analysis studies can provide an accurate estimation of the effects of a production process when there is a single output, the results of such an analysis may not hold in cases where a process simultaneously produces two or more outputs. School systems may produce "intermediate" outcomes that lead to the "final" output; for example, a school's positive or negative influence a student's attitudes about education may translate to increased or decreased test scores. In cases where a process produces two final outcomes, a single output model may fail to effectively estimate the production function (Hanushek, 1979). If a school is expected to produce academic results only, then the school can be expected to attempt to maximize students' academic achievement by the most efficient use of its inputs (teachers, instruction time, textbooks, facilities, etc.). However, if a school is expected to produce both academic

achievement and career skills, then it becomes much harder to estimate an accurate production function without knowledge of the interactions of the two outputs in the production process and the weight put on each output. In this case, I have specified a regression model assuming that the single output is academic achievement, as represented by standardized test scores. Although other studies may address human capital outputs or other measures of education production, in this model, I expect improving academic test scores is a primary goal for schools and represents a single output of the education system. State and federal policies hold schools accountable for their test scores, funding decisions are often made based on these metrics, and outside entities like parents, colleges, and school rating bodies treat this metric as an important component of education.

Measurement of Education Outputs

Another major problem in estimating the education production function is the variety types of measurements used to assess student outcomes. Although academic test scores are often used as a way to measure students, there are a variety of other measures that may be more appropriate, depending on the type of study being conducted. In some cases, researchers have used measures of employment to estimate the effects of schools. However, the "human capital" model of valuation assumes that the final product of the education system is a student's future employability. Models that rely on human capital production may omit the other goals of education, such as participation as a citizen, continued academic achievement, and individual enrichment (Fortune & O'Neil, 1994).

The lack of precise data on such human capital measures presents additional issues in using labor market factors to measure the education production function. While aggregated employment data is generally available for local areas, test scores are more commonly available

in connection with individual students and schools. In addition, parents and institutions of higher education seem to value increased test scores by themselves (Hanushek, 1979). As previously stated, the use of standardized test scores should provide a more accurate measurement of education outputs than other measures such as dropout or graduation rates, participation in higher education, job placement, or future earnings. In general, state and federal policies identify test scores as a primary metric of success.

Omitted Variable Bias

In a regression analysis, if any variables are omitted from the function, the omission will result in a bias in the regression coefficients of the included variables. The size of the bias in this case will be related to both the importance of the variable in producing the output the strength of the omitted variable's interaction with the included variables. This problem can occur in estimating an education production function if there are unmeasured variables such as a student's innate abilities or characteristics of specific schools that significantly affect the education process (Hanushek, 1979). For instance, if there is no variable to account for parental influence on student achievement, then the effects of parental influence may mistakenly be included in the regression coefficients of other variables. Although I expect that the logical model that I have based my regression on to be fully specified to account for the major variables that affect student outcomes, there may still be some unspecified factors that bias the regression coefficients. However, any bias is relatively small, considering the number and magnitude of effect of the factors that I have included in my regression model.

Measurement Error

Education studies typically use standard data that are already regularly collected and available to the public. However, such data can often lead to inaccurate regression results if the

researcher does not take into account the different measurement errors that can occur. Data that are regularly gathered for administrative purposes tends to mix or aggregate measurements in ways that can severely impact regression results. Readily available datasets commonly provide average characteristics for schools, students, and teachers; such data can also cause issues by mixing units of measurement (Hanushek, 1979). Administrative data may provide test scores for individual students, while it reports average class sizes, and district level expenditures. The definitions of these data elements may not be clear and the data that are entered may be inaccurate if they are entered by untrained personnel, or if there are no strict controls or auditing.

Considering that individual students have distinctly different backgrounds and that no two schools are exactly the same, these types of errors in measurement have the potential to grossly distort regression results. In order to account for such errors, I ensure that my selected variables are as consistent as possible in terms of the units of analysis and the aggregation of the measurements. However, since I am limited by the data that I use in this study, I have provided descriptions of the variables that I include in this analysis and I have also specified the units of analysis and any aggregation of the data.

Processes Variation

A typical production function applied to an economic firm assumes that the technological process that turns inputs into outputs is a publicly known best available practice. However, this assumption does not necessarily hold true when the production function approach is applied to education. Some parts of the education process are directly observable and can be easily measured; this includes processes like development of curriculum, class structures, instructional formats, length of the school day or year, and other structural components or education. Other processes are either unclear or there is no objective best approach (Hanushek, 1979). For

instance, teachers' communication skills are hard to quantify and no measures may be available to describe these characteristics. In another case, there is not necessarily one objective "best" way to educate students, since they may respond differently based on their individual ability to absorb abstract ideas in different formats. Since such variation is typical in any education study, I report the results of the regression analysis with the understanding that there may be unaccounted for variation at the school or classroom level. While this variation may be better described using specific case studies by selecting a representative sample of schools or classes instead of statistical analysis, that is not the objective of this study.

Causal Relationships

The inclusion of education variables that have no effect on the output in an education production function can be avoided by specifying a clear causal logic model that describes the expected interactions between the variables of the regression analysis. In this case, I base my regression analysis on the following logic model:

[FIGURE 2]

In this model, I expect the key effects come from school expenditures, which have both a direct effect on student outcomes and some mediated effects through teacher characteristics. I expect that increased spending on classroom instruction is the primary factor that would increase students' academic performance. Funds spent on classrooms, school facilities, and instructional materials should also directly affect students' ability to learn. Reduced class sizes may provide teachers with more one-on-one instruction time with pupils and lead to increased academic success. However, some expenditures, such as teacher salaries do not directly affect students' academic performance, though they may provide an incentive for teachers and lead to better quality education. Funds spent on professional development and instructional leadership may also

increase teachers' performance in the classroom, which may translate to improved student outcomes.

In this model, I also assume that the relationship between parental characteristics (i.e., education level, income, or parental involvement) and student outcomes is fully mediated by student characteristics (i.e., attitudes towards school, student resources, or cognitive ability). I expect this relationship because parents generally do not directly provide academic instruction for their children. Although parents may provide an important source of support, resources, and assistance with schoolwork, they are not the dominant instructional figure in their children's education.

This model also includes a direct relationship between student characteristics and student outcomes. Characteristics such as a student's English language proficiency, ability to learn, and other innate abilities may directly affect their academic success. I expect that the effects of school characteristics such as the percentage of English language learners or the percentage of socioeconomically disadvantaged students may also have both a direct effect on student outcomes and some mediated impacts. Indirect factors such as access to quality schooling, non-instructional resources for English language learners, or many other mediating influences may be involved in these relationships.

I expect that the effects of state, school district, and school site policies, such as teacher selection criteria, class sizes, or extracurricular offerings to be fully mediated by a combination of teacher characteristics and school expenditures. These policies generally control the quality and quantity of teachers by setting standards for individual school sites. While policies may affect the types and amounts of spending at local schools and the kinds of programs offered, they do not generally have a direct effect on students' academic abilities.

I expect that the effect of teacher characteristics would have a direct effect on student outcomes without and mediating factors. More experienced teachers can be expected to provide a better learning experience and have more skills to provide for a broad range of students of differing levels of ability. Higher qualification standards such as teaching credentials, subject matter certifications, and years of postgraduate education can be expected to provide higher quality teachers, which should lead to better academic success.

In order to determine these effects, I perform two separate regression analyses in the following chapter. In the first model, I use the following general equation to examine the relationship between academic test scores, expenditures, student characteristics, and school characteristics:

TAKS Score	=	f(*Expenditures, Student Demographics, Campus Characteristics*)
Expenditures	=	f(Instruction, Instruction Related, Instructional Leadership, Other, School Leadership, Supportive Services, Total Operating Funds)
Student Demographics	=	f (Percent African American, Asian-American, Hispanic, Native American, Pacific Islander, Two-or-more Races, White, At-risk, Bilingual, Career and Technical Education, DAEP, Economically Disadvantaged, GATE, LEP, Special Education)
Campus Characteristics	=	f(Charter School, Campus Location, Average Teacher Experience, Average Class Size [*Grades 3 through 6 only*])

In the second model, I examine the relationship between exemplary performing schools with particular majority groups of students and the same set of characteristics using the following general model:

Exemplary Performance	=	f(*Expenditures, Student Demographics, Campus Characteristics*)
Expenditures	=	f(Instruction, Instruction Related, Instructional Leadership, Other, School Leadership, Supportive Services, Total Operating Funds)
Student Demographics	=	f (Percent African American, Asian-American, Hispanic, Native American, Pacific Islander, Two-or-more Races, White, At-risk, Bilingual, Career and Technical Education, DAEP, Economically Disadvantaged, GATE, LEP, Special Education)
Campus Characteristics	=	f(Charter School, Campus Location, Average Teacher Experience)

Each regression analysis contained 27 or 26 explanatory variables (depending on whether or not class size was included in the lower grades), which means that my analysis produced a 712 individual variable results. However, the first thing one must consider in interpreting the results is whether or not the effect of the variable is statistically significant. Regression analyses produce results that include an estimation of the high and low boundaries of the effects of each independent variable, which is called the confidence interval. If the confidence interval includes zero, then it is possible that the independent variable actually has no effect on the dependent variable. Since a confidence level of at least 95 percent indicates that the confidence interval does not include zero, I base my interpretation of these results only on the variables with a 95 percent or higher confidence level.

While some of these results may be statistically significant, that does not in itself mean that the independent variables are having a meaningful effect on the dependent variable. The second thing to consider is whether or not a variable has a substantial magnitude of effect by measuring the regression coefficient. The regression coefficient is the measure of the effect that

each variable is estimated to have on the dependent variable. For example, if a variable returned a regression coefficient of one, then one could conclude that a one-unit change in the variable would potentially produce an estimated one unit change in the dependent variable. So, while a variable with a result that is statistically significant above a 99 percent confidence level has a less than 1 percent chance of being a result of random chance, if this variable has a regression coefficient of 0.00001, then the effect would essentially insignificant on the dependent variable.

Conclusion

Although the multivariate regression approach can provide much more precision than simple linear correlation relationships, there are many factors to consider when approaching such an analysis. Problems with the selection of variables, the relationship between inputs and outputs, and accurate measurement of student outcomes can lead to biased or inaccurate results. A regression analysis must be based in a theoretical model in order to determine what variables to include or exclude and to provide some fundamental backing for the estimated production function relationship. In this chapter, I have presented the logical model that I use as the basis of my regression analysis. In the following chapters, I describe my data, report the results of the analysis, and provide an estimation of the expected impacts of education expenditures to inform the development of education policies and provide accountability for financial planning under the LCFF.

Chapter Four

RESULTS

After reviewing the literature on the relationship between spending and academic performance, I determined that a regression analysis was an appropriate way to study how expenditures affect student performance, given the relationships that exist in theory between student backgrounds, school inputs, and teacher characteristics. I used an ordinary least squares (OLS) regression analysis to determine the relationship between school financial decisions and average standardized test scores, while controlling for the complex interactions among the many other inputs of the education process. Based on the results of this first analysis, I also performed a separate secondary regression analysis using a logistic regression model to determine if a non-linear relationship exists between expenditures and exemplary performing schools, with differing effects based on the majority composition of the school.

In this chapter, I first provide an overview of the data sources I used in the regression analysis. Next, I provide the detailed information on the financial and standardized test score reports. I include the specific variables I used from these data sets and the full descriptive statistics of the entire dataset. Finally, I provide the results of the regression analysis and the significant findings from each model, which show that school-level financial decisions are a significant factor in academic achievement.

Data Sources for the Regression Analyses

I obtained the data for this regression analysis from the Texas Education Agency's publicly available education reports through the state's Public Education Information Management System (PEIMS), which provides access to all data that the state requests and receives from public education entities. These data include student demographics, academic

performance results, personnel statistics, financial amounts, and other organizational information (Texas Education Agency, 2016 a). The PEIMS records allow access to school financial reports as well as results from the Texas Assessment of Knowledge and Skills (TAKS) tests administered from 2003 through 2011. I used the 2010-2011 state fiscal year data which was available through the PEIMS for these two data sources to compile a single dataset for my regression analysis.

Financial Report Data Elements

The 2010-2011 school financial report contains standard data elements that all Texas schools and districts are required to report by state law. Section 44.007 of the Texas Education Code requires each school district to adopt a fiscal accounting system that meets the minimum requirements prescribed by the State Board of Education. Districts are required to report financial information that enables the State Board of Education to monitor funds and determine the costs by district, campus, and program. Although districts have an option to use some more specific local codes, districts must use the standard sequence of the accounting codes uniformly in accordance with state law and generally accepted accounting principles. These financial reports are also subject to regular monitoring and audits (Texas Education Agency, 2011 a).

The financial reports provide data on school-level expenditures by funding type, function, and program. The funding types provide the source of the funds, functional areas provide the general reason for the expenditure, and program areas provide for the division of funds based on the division of funds budgeted to schools for particular groups of students. These areas are discussed in further detail in the following sections.

The available data in the PEIMS includes financial reports for both budgeted funds and actual expenditures in each fiscal year. I used the actual expenditure reports, since the amount

spent can vary between the amounts budgeted and the amounts that are actually spent in any given year due to variations in federal funding, state, obligations, or unexpected expenditures.

Funding Types

The funding types include local, state, and federal revenues. For the purposes of this analysis, I used the total funding from all sources—including local, state, and federal funds. The amount of state and federal funds received by schools can vary greatly and these supplemental funding sources can provide a significant portion of some schools' budgets. Selecting only one particular kind of funding would provide an inaccurate comparison between schools and improperly bias the regression results.

Functional Areas

Functional areas include payroll costs, professional and contracted services, supplies and materials, and other operating costs, but exclude other areas such as capital outlay, facility construction, debt service, and intergovernmental charges (Texas Education Agency, 2011 a). These data are further broken down by the total amount of funds spent, amount spent per pupil, and amount spent as a percentage of total operating funds. The total operating expenditure amounts for each campus are broken down to the following fifteen sub-categories:

- Instruction – Expenditures on activities that deal directly with the interaction between students and teachers and payments for juvenile justice alternative education programs.
- Instructional Resources/Media – Expenditures on resource centers, library maintenance, and other major facilities dealing with educational resources and media.
- Curriculum/staff development – Expenditures used to plan, develop, and evaluate the process of providing learning experiences for students.

- Instructional leadership – Expenditures used to manage, direct, supervise, and provide leadership for staff who provide instructional services.
- School leadership – Expenditures used to direct and manage a school campus.
- Guidance Counseling Services - Expenditures used to assess students' abilities and interests, to counsel students on career and educational opportunities, and to help students establish realistic goals.
- Social Work Services – Expenditures used to investigate students' social needs, conduct casework and group work services for children and parents, and interpret the social needs of students for other staff members.
- Health Services – Expenditures used to provide physical health services that do not include direct instruction.
- Transportation – Expenditures for student transportation.
- Food - Expenditures used to pay for food service operations.
- Extracurricular – Expenditures for school-sponsored activities outside of the school day that are not essential to the delivery of services for instruction, instructional and school leadership, or other supportive services.
- General Administration - Expenditures used for managing or governing the school district as an overall entity.
- Plant Maintenance/Operation - Expenditures used to keep the facilities open, clean, comfortable, working, in repair, and insured.
- Security/monitoring – Expenditures used to keep student and staff surroundings safe on campus, in transit to or from school, or in school-sponsored events at another location.
- Data processing services – Expenditures used for in-house or contracted data processing services.

For this analysis, guidance counselling, social work, health services, transportation, food, and extracurricular activities were rolled up into a single "supportive services" expenditure category and general administration, plant operation/maintenance, security/monitoring, and data processing were rolled up into an "other" expenditures category.

Program Areas

The financial reports also contain expenditure data by program, although the Texas Education Agency cautions that these data are not comparable to the total operating expenditures. The breakdown of expenditures by program does not include general administration and data processing, which are included as part of the total operating expenditures. These expenditures also exclude debt service, facilities acquisition and construction, charter school fundraising, and equity transfers. Program expenditures include the following eleven sub-categories identified by the state:

- Regular - Expenditures to provide the basic services for education/instruction to students not in special education.
- Gifted and Talented (GATE) - Expenditures to provide instructional services beyond the basic educational program, designed to meet the needs of students in gifted and talented programs.
- Career and Technical - Expenditures to provide services to students to prepare them for gainful employment, advanced technical training, or homemaking, which may also include costs for apprenticeship and job training activities.
- Special Education – Expenditures for services to students with disabilities and the costs incurred to evaluate, place, and provide services to students who have approved individualized education programs.

- Accelerated Education – Expenditures on instructional strategies for campus and district improvement plans to provide services in addition to those allocated for basic services for instruction, which are intended to increase the amount and quality of instructional time for students who are at risk of dropping out of school.
- Bilingual - Expenditures to provide services that are intended to make the students proficient in the English language, primary language literacy, composition, and academic language related to required courses.
- Non-disciplinary Alternative Education Program (AEP) - Expenditures to provide baseline services to at-risk students who are separated from the regular classroom to a non-disciplinary alternative education program.
- Disciplinary Alternative Education Program (DAEP) – Expenditures to provide baseline services to students who are separated from the regular classroom to a disciplinary alternative education program.
- DAEP Supplemental – Expenditures that supplement baseline services for students who are separated from the regular classroom to a disciplinary alternative education program.
- Compensatory – State expenditures to supplement federal awards for use on Title I, campuses with at least 40 percent educationally disadvantaged students.
- Athletics – These expenditures are the costs to provide for participation in competitive athletic activities, including coaching costs and the costs to provide for sponsors of drill team, cheerleaders, pep squad, or any other organized activity to support athletics, excluding band.

The expenditure data by program for the accelerated education, non-disciplinary AEP, DAEP, and DAEP supplemental programs was rolled up into a single category for "other" expenditures in this analysis (Texas Education Agency, 2011 a).

TAKS Data Elements

Since 1980, the Texas education system used standardized tests in parallel with basic educational standards in order to assess students' academic progress. The Texas Assessment of Basic Skills (TABS) was the first statewide-standardized test, which was in use from 1980 until 1983. The TABS tests assessed basic skills competencies in math, reading, and writing in grades three, five, and nine.

In 1984, this test was replaced by the Texas Educational Assessment of Minimum Skills (TEAMS), which ran through 1990. These TEAMS tests were given in grades one, three, five, seven, nine, and eleven to test math, reading, and writing skills. Once students passed a test in the TEAMS system, they no longer needed to take the exam. Passing the eleventh grade "exit level" test was required in order to graduation high school.

The Texas Assessment of Academic Skills (TAAS) was the state's third standardized test, which was administered from 1991 through 2002. The TAAS test assessed math, reading, and writing competencies in grades three, five, seven, nine, and eleven. Students were still required to pass the eleventh grade TAAS test as a graduation requirement.

In 2003, the state created the TAKS test as a successor to the TAAS. The TAKS test was the fourth statewide-standardized test, which was administered from 2003 through 2011 in grades three through eleven to assess students' reading, writing, math, science, and social studies skills under the Texas Essential Knowledge and Skills (TEKS) education standards. Although the TAKS test was replaced by the current State of Texas Assessments of Academic Readiness (STAAR) standardized test in 2012, in this analysis I used 2010-2011 state fiscal year financial data in combination with the 2010-2011 academic year TAKS test results (Texas Education Agency, 2007).

The TAKS data contains both raw and scaled average scores for 27 separate tests administered from grade three through eleven at all Texas public schools. The TAKS math and reading tests were administered through all nine grades, while the writing, science, and social studies tests were only administered in certain school years. The TAKS writing tests were administered in grades four and seven; science tests were administered in grades five, eight, ten, and eleven; and history tests were administered in grades eight, ten, and eleven.

The TAKS data contains the number and percentage of students tested in each school, as well as the numbers and percentages of students in certain specific demographic categories. These demographic data include the count and percentage of tested students who identify as African-American, Asian-American, Hispanic, Native American, Pacific Islander, White, or two or more races. The data also include the counts and percentages of tested students who are considered at-risk of dropping out of school; students who are bilingual or have limited English proficiency (LEP); and students who are enrolled in a career or technical education program, DAEP, GATE, or a special education program (Texas Education Agency, 2016 b).

The Texas Education Agency's accountability system in place between 2002 and 2011 included categorical ratings of districts and campus level to provide a simplified assessment of school performance. Schools with at least one TAKS test result in any subject that met minimum size standards received a rating of exemplary, recognized, academically acceptable, or academically unacceptable based on a variety of factors (Texas Education Agency, 2011 b). In order to be rated as exemplary, schools must:

- Meet a 90% standard for each TAKS subject for all students and for each student group (African American, Hispanic, White, or economically disadvantaged) that meets the minimum size requirement.

- Meet or exceed 60% of the criteria or meet the required improvement level for ELL students.
- Meet a 25% standard for commended performance on the Reading and Math TAKS subject tests for all students and specifically for economically disadvantaged students.
- Meet a 95% standard for completion rates for all students and for each student group (African American, Hispanic, White, or economically disadvantaged) that meets the minimum size requirement.
- Meet a 1.6% standard or meet the required improvement level for annual dropout rates for all students and for each student group (African American, Hispanic, White, economically disadvantaged) that meets the minimum size requirement.
- No more than one exception may be applied to TAKS or ELL indicators if the school would be "recognized" due to not meeting "exemplary" criteria (exceptions are provided to larger campuses and districts with more diverse student populations who are evaluated on more measures).

Data Preparation and Summary Statistics

In order to compile the demographic and financial data from the PEIMS and the test score data from the TAKS, I began by joining the datasets using the unique campus number. The combined dataset contained a total of 7,567 elementary and secondary schools. While all 7,567 of these schools reported the demographic data required by state law, many campuses did not report certain types of financial data, test scores, or other campus data elements. The table below provides the descriptive statistics of each variable in the combined dataset.

[TABLE 7]

Ordinary Least Squares Regression Shows Expenditures Generally Relate to Higher Test Scores

The purpose of the OLS regression analysis is to provide a general equation that models linear relationship between a dependent variable and a variety of explanatory independent variables. In this case, I examine the relationship between expenditures; school, student, and staff characteristics; and standardized test scores. I used the general model described in the preceding chapter to run 27 separate regression analyses with the third through eleventh grade TAKS reading, math, writing, history, and science test scores as the dependent variables. The OLS regression demonstrates that expenditures in the instruction, instruction related, instructional leadership, supportive services, and other activities categories were important predictors of increased test scores, while school leadership had mixed positive and negative relationships across the 27 test results.

After controlling for school characteristics and student backgrounds, my analysis demonstrated that the expenditures by function had a significant effect on average test scores. Expenditures on instruction related and instructional leadership activities were correlated to higher test scores in every statistically significant result. In the majority of cases, expenditures on direct instruction, supportive services, and other expenditures were also related to higher test scores, although spending on school leadership showed mixed effects. Increases in total operating funds tended to have a negative relationship with test scores, which I expected due an education-funding model that provides increasing funds for underperforming schools.

Out of the 28 separate OLS regressions that I performed, 280 of the variables returned statistically significant results. In the following table, I provide a complete listing of the 280 statistically significant results, which are first grouped by the category and type of variable and then sorted by the regression coefficient (from highest to lowest). A single star indicates the

variable was significant at the 90 percent confidence level, two stars indicate that the variable was significant at the 95 percent confidence level, and three starts indicate that the variable was significant at the 99 percent confidence level.

[TABLE 8]

In this analysis, I provided the expenditures variables in units of one-hundred dollars spent, per pupil. Since these expenditures are in units of $100 per pupil, the results show the difference in test scores that could be expected from difference in expenditures of $100 per-pupil. These results demonstrate that school expenditures are both statistically significant and have a substantial magnitude of effect on test scores.

The results show that expenditures on instruction related and instructional leadership activities were correlated with increased average test scores in third, eight, ninth, tenth and eleventh grade reading, math, science and history. Each $100 spent per-pupil on instruction related activities explained between 2-points and 11-points higher on average test scores, while each $100 spent per-pupil on instructional leadership explained between 2-points and 7-points higher on average test scores.

Direct instruction, supportive services, and other expenditures were correlated to higher test scores in a majority of the statistically significant results. A $100 difference in instructional spending per-pupil accounted for a range from 11-points lower to 11-points higher average test scores. Supportive services expenditures accounted for between a 12-points lower to 10-points higher on average test scores, for each $100 spent per-pupil. Each $100 in other expenditures per-pupil explained between an 8-points lower and 11-points higher on average test scores.

However, school leadership expenditures were evenly split between positive and negative results. A difference of $100 in funding explained a range between 35-points lower and 11-points higher on average test scores. While a majority of the total operating fund results showed a

negative relationship between funding and test scores, this result is expected based on the Texas financing system, which provides more funding to lower performing schools. The full OLS regression results appear in the following tables.

[TABLE 9-1 TO 9-28]

After running these OLS regressions, I also tested the results for heteroscedasticity and multicollinearity. Using the Breusch-Pagan / Cook-Weisberg test, I found that the data in each OLS regression was heteroscedastic. After running variance inflation factor tests, I also found that there was significant multicollinearity between the percentage of African-American, Asian-American, Hispanic, Native American, two or more races, and White students; the percentage of DAEP, LEP, and bilingual students; the amount of instructional, instruction related, instructional leadership, supportive services, and other expenditures; and the total operating funds. Since education budgets and school characteristics are closely related to student demographics and external socioeconomic factors, multicollinearity is an expected result that I was unable to correct for in this analysis. However, given the limited number of statistically significant racial and ethnic student demographic categories, a secondary analysis was also warranted to explorer whether there were particular effects that did not appear in the OLS regression model.

Logistic Regression Shows the Non-Linear Relationship Between Expenditures, Majority Demographics, and Exemplary Performance

In a secondary logistic regression analysis, I examined whether certain factors could predict if a school met the Texas state standards for exemplary performance. In this logistic regression, I used exemplary performance as the dependent variable and provided the same explanatory factors used in the OLS regression, with the exception of average class sizes, since

this analysis applied to entire schools and class sizes were only made available for grades 3 through 6. I separated the schools by their majority demographic populations, to examine whether the effects were significantly different depending on the composition of the school. The logistic regression results show that schools with no racial or ethnic majority or majority White schools had mixed positive and negative results with instruction expenditures, although they were more likely to be exemplary performing schools with increased expenditures in instruction related, instructional leadership, other activities, school leadership, and supportive services. On the other hand, majority Latino, majority economically disadvantaged, majority at-risk of dropping out, and majority African American and Latino schools were less likely to be exemplary performing schools based on these same expenditure categories.

Out of the entire 7,567 schools in the data set, 1,185 of the campuses qualified as exemplary performing schools according to the state of Texas' standards. The purpose of this regression analysis was to determine if high performing schools with a majority of one of the demographic categories might be spending money differently than schools with other kinds of demographic compositions, which might lead to different outcomes. The results of the logistic regression showed that, in general, increased expenditures and greater total operating funds are more likely related to exemplary performance for schools with no racial or ethnic majority and schools with a White majority. Higher expenditures and greater total operating funds in schools with a majority of African-American, Latino, economically disadvantaged, or ELL students tended to be less likely to be related to exemplary performance.

I ran nine separate logistic regressions and selected a different set of schools in each analysis. The groups selected were schools that were majority African-American, Asian-American, Latino, or White; schools with no ethnic/racial majority, schools that were a majority African-American and Latino, when these two groups are combined; and schools that were

majority at-risk, economically disadvantaged, or ELL students. However, the data included only three majority Asian-American schools, which did not provide enough observations to complete an analysis for that particular subset of schools. The table below contains the statistically significant results of the logistic regression.

[TABLE 10]

The logistic regression results provide the likelihood that a school of the selected demographic composition has exemplary performance, after controlling for the various inputs. For schools with no racial or ethnic majority, a school was statistically significantly more likely to be exemplary by 2.6 percent for each $100 difference per-pupil in expenditures on instruction, by 6.5 percent for each $100 difference per-pupil in expenditures on instructional leadership, by 5.1 percent for each $100 difference per-pupil in other expenditures, by 3.3 percent for each $100 difference per-pupil in expenditures on school leadership, and by 4.1 percent for each $100 difference per-pupil in expenditures on supportive services. Schools with no racial or ethnic majority were 3.5 percent less likely to be exemplary for each $100 difference in total operating funds per-pupil.

Schools with a majority White students were 0.1 percent less likely to be exemplary for each $100 spent per-pupil on instruction, while they were more likely to be exemplary performing by 3.2 percent for each $100 spent per-pupil on instruction related activities, by 0.4 percent for each $100 spent per-pupil on other expenditures, and by 2.5 percent for each $100 spent per-pupil on supportive services. A difference of $100 in total operating funds per-pupil was 0.3 percent more likely to relate to exemplary performance.

Majority Latino schools were 0.1 percent less likely to be exemplary for each $100 spent per-pupil on instruction and 0.6 percent less likely to be exemplary for each $100 spent per-pupil on instructional leadership. Majority African-American and Latino schools were 1 percent less

likely to be exemplary for each $100 spent per-pupil on instruction related activities. Schools with a majority of economically disadvantaged students were 0.3 percent less likely to be exemplary for each $100 spent per-pupil on instruction related activities. Schools with a majority of students at risk of dropping out were 0.3 percent less likely to be exemplary for each $100 spent per-pupil on instructional leadership.

The full logistic regression results are reproduced in the following tables.

[TABLES 11-1 TO 11-8]

Conclusion

In this chapter, I provided a synopsis of the data involved in the regression analyses and explained the source of the data and the composition of the various categories. I first provided the subset of the results for the OLS regression that were statistically significant and then explained how these results demonstrate the generally positive linear relationship between expenditures and test scores. I followed this with the results of the logistic regression, which examined whether there were non-linear relationships between expenditures, majority student populations, and exemplary performance.

The OLS regression results demonstrate the statistically significant relationship that expenditures have on student academic performance and, in particular, highlighted the importance of expenditures on instructionally related and instructional leadership activities. The logistic regression results provided a clear example of how schools with no racial or ethnic majority and White majority schools had a very different relationship between expenditures and exemplary performance than majority Latino and African American schools and schools with a majority of students who are economically disadvantaged or at risk of dropping out.

In the final chapter, I explore how the results of these regression analyses might be used by policy makers in real world decisions to increase student academic achievement and encourage school performance. I consider how these issues fit in to the policy framework presented by the LCFF and I also review the gaps presented in this analysis and suggest avenues for future studies based on the results of these regression analyses. Finally, I return to the original question presented in this paper and conclude with a synopsis of the results of this analysis.

Chapter Five

DISCUSSION

The regression analyses that I performed demonstrated that there are important connections between expenditures and academic achievement and that different effects occur in schools with high concentrations of minority students. In this chapter, I review the research results, discuss the potential policy implications, and identify areas for future study based on the results of this work. I begin by returning to my original research questions and explain how my regression analysis demonstrates the significant connection between school expenditures and academic test scores. I then discuss some of the implications of these results and highlight particular issues surrounding data collection, multiple measures of school accountability, and program funding. Finally, I offer areas for future study based on this work and concluding thoughts on the application of these regression results to the California education system, in light of the increased flexibility offered by the LCFF.

Financial Decisions are an Important Factor in Academic Performance

The purpose of this work is to study the effects of school-level financial decisions on students' academic achievement. Using the expenditure data, along with information about student demographics, campuses, teacher characteristics, and TAKS test scores, the regression analysis demonstrated that expenditures in certain functions had a statistically significant relationship with academic performance. In general, school spending in the functional areas of direct instruction, instruction related activities, instructional leadership, supportive services, and other activities was related to increased test scores, while expenditures in school leadership had both positive and negative relationships with test scores.

The general results differed from an analysis of schools based on their majority demographic composition. Schools with no racial or ethnic majority and majority White schools had no clear relationship between direct instructional expenditures and exemplary performance. However, these schools were more likely to be exemplary performing if they had greater expenditures in instruction related, instructional leadership, school leadership, and supportive services. On the other hand, schools with majority Latino, economically disadvantaged, at-risk, and African American populations were less likely to be exemplary performing schools based on higher expenditures in direct instruction, instruction related activities, instructional leadership, school leadership, and supportive services.

The first analysis demonstrated that there was a simple linear relationship between expenditures in certain functional areas and test scores, where increasing funding had a connection to higher test scores. However, the secondary analysis also showed that schools with high concentrations of minority students or at risk students did not share the same characteristics as schools with a majority of White students or no racial or ethnic majority. These results underscore that there is a need for policies that take into account the majority composition of schools. Campuses with higher concentrations of minority students should be treated differently in terms of funding than campuses with White majorities or no ethnic or racial majority.

The regression analyses also provided evidence of the approximate magnitude of effect between these financial inputs and academic achievement. Each $100 spent per pupil on instruction related activities explained between 2 points and 11 points higher on average test scores. Overall, each category of spending by function explained between 1 and 10 points of the variation in test scores for each $100 spent per pupil. While the campus type and student demographics also had significant relationships with similar or greater magnitudes of effect, the expenditures were clearly a significant part of academic performance. These expenditures

represent a critical component of the education process because they are much easier for the state to control and account for than the campus type and demographic effects. Policy makers can expect that changes funding will have a significant and direct impact on test scores and that schools with high concentrations of minority students will not receive the same effects as schools with a majority of White students or no with racial or ethnic majority.

Though this analysis demonstrated a statistically significant relationship between funding and academic performance, the presence of this relationship does not necessarily indicate whether there is a causal effect occurring. While it is possible that increased expenditures in instruction are causing increased test scores, it is also possible that schools with higher test scores receive additional funding. Similarly, majority White schools or schools with no racial or ethnic majority may receive more funding than majority Latino or majority African-American schools, which may cause the apparent difference in academic outcomes between these two types of schools. A logical argument can be made that either or both types of causation are at work in California's schools. It is possible that additional expenditures increase test scores, while schools with higher test scores may also be rewarded by the state with additional funds. These facts are important as local policymakers consider what fiscal actions they may take with the new flexibility accorded by the LCFF.

Funding by Functional Areas or the Use of Different Program Metrics are Important Considerations for the Future of Education Finance in California

The LCFF reversed decades of state control over California school finances and removed many categorical programs in favor of more simplified formula funding that leaves financial decisions in control of local education agencies. These local entities must make financial decisions that may affect student outcomes, while also responding to major changes in school

accountability mechanisms. The evidence from this analysis demonstrates that the amount of money spent by schools and the functional areas where schools chose to spend their money clearly matter to student outcomes on academic tests. However, large concentrations of minority students or students who are at risk change the dynamics of the relationship between spending and academic achievement.

California's local education agencies must be thoughtful of these characteristics as they make their decisions to allocate education funds. As a result of this analysis, I find that the state's education system should include more targeted data collection efforts at a local level, measure student and school success using more outcomes than test scores alone, and increase funding to functional areas rather than continuing the current categorical program model. Categorical funding streams have tended historically to relate to specific policy goals, such as reducing class sizes, expanding extra-curricular activities, or constructing facilities. While these policy goals may be admirable, expenditures on particular program areas do not appear to have a statistically significant relationship to academic test scores. If policy makers choose to fund these types of categorical programs, then test scores may not be an appropriate measure of success. Alternative measurements, such as parent surveys of school climate or college acceptance rates, may better capture the outcomes of these categorical programs.

Improvements in Data Collection are Necessary to Ensure Accountability and Provide for Accurate Research

The state currently mandates extensive data collection at the district and school level for multiple purposes, yet this data collection may be insufficient to capture the elements necessary to account for student success. Aggregate data reported on test scores and financial expenditures does not necessarily connect the inputs of education to the system's outcomes. For instance, the

data from this analysis on school budgets, program expenditures, and staff salaries showed no relationships to academic achievement, even though the logical argument can be made that there is a connection between these financial elements and student outcomes. These relationships could be unclear because schools may not actually expend budgeted program funds on certain programs, if the state has lax fiscal controls, programs may not actually work as intended, or because aggregate data on average salaries or large block grants may not directly relate to the academic effects. For instance, if there is a direct relationship between teacher compensation and student achievement, but a school only reports a single average salary for all teachers or average salaries for certain groups of teachers, then the relationship may not be apparent in a regression model.

One answer to these data collection efforts could be implementation of additional optional local data models. The state may create the structure for certain data collection efforts, such as more detailed expenditure categories or fine-grained teacher compensation data, and allow schools or districts to participate optionally in these reports. Alternatively, local education agencies could create additional data collection as a part of their accountability measures to report the connection between their expenditures and student outcomes (Kirst, 2016). Without accurate and relevant data, it is impossible to tell if the policies advanced by the education system are having the expected effects on students' academic achievement.

Although the Texas PEIMS repository offers data on many facets of the state's public education system, I encountered limitations performing a regression analysis with this data. The PEIMS data provided school budgets, expenditures by function, expenditures by program, and teacher salaries. However, the regression models that I tested using these data elements did not provide statistically significant results, except in the case of the expenditures by function. The school budgets and expenditures by program were broken down into categories that likely

provided more value in accounting for funds and did not reflect the actual use of these funds, so these did not provide a direct connection to academic performance. The teacher salary data provided average salaries, which were aggregated into categories based on the teachers' years of experience (e.g., new teachers, 1 to 5 years of experience, 6 to 10 years of experience, etc.). This aggregation provided little variation between schools and failed to provide any statistically significant results. Data at the individual teacher salary level may have provided a clearer connection between teacher compensation and students' academic achievement.

The use of Texas' education data may also present challenges in generalizing my results to California's education system. Although the demographics of these schools may be the same, there are considerable differences in state operations and policies between the two states. While California is beginning to entrust local education agencies to make decisions about school expenditures, the state of Texas has had a local control and accountability system in place since 1993 (Texas Education Agency, 2011 b). School funding in California is only beginning to use a system that includes weighted student formulas, while Texas school funding includes multiple weighted student categories, facilities allotments, wealth redistribution by districts, and many other factors. Since these funding systems are very different, comparisons between some facets of California and Texas' education systems may not always apply.

The Education System Must Include Multiple Measures of Accountability that Account for School Outputs and Priorities

As the state embarks on a new accountability system using multiple measures, local education agencies will feel increased pressure to justify their outcomes on many separate fronts. While the state has not yet hashed out every detail of the new accountability system and any effort at such a wide scale change will likely need revisions in the coming years, many parties see

significant promise in moving from the single mechanism of test scores to a dashboard of several metrics (Freedberg, 2016). Such a system should account for the differences in schools with high concentrations of minority or at-risk students, as identified in this analysis. These schools face different challenges to improve student outcomes and should be held to different standards that are appropriate for the measures taken to address their particular issues. For example, a school with a large number of English language learners may choose to spend resources on language acquisition skills and should rightly focus on accountability measures that represent progress in language acquisition. However, such a school should not be subject to arbitrary standards of year-over-year average test score improvement that do not take into account the specific challenges of the students involved.

In essence, as local education agencies receive more control over their financial decisions and policy priorities, these agencies should be able to set goals and reach for outcomes that are tailored to their specific policy choices, while being held accountable in ways that are connected to those choices. For instance, a school with high concentrations of minority students may choose to focus on college readiness instead of test scores, since the achievement gap between these students groups is a significant area of public concern. A school with a majority of at-risk students may instead focus on career skills and vocational employment as a way to engage students. Yet, it would make little sense for a school that is focused on vocational education to be held to the same college readiness standards as a school that is focused on preparing students for college success. Financial decisions should be linked to both the policy priorities and the accountability measures at the local level. If the state continues to hold all schools accountable in the same manner, the disparities will undermine the principles of the LCFF. These changes will allow local entities, parents, and communities to hold schools accountable to their individual expectations through the LCAPs process.

The low r-squared values that I encountered while specifying my regression model also suggest that there were a number of effects that were not accounted for in this analysis. These effects may be variables that were not included in the regression inputs or they may be a result of the dependent variable that I selected. Some regression analyses that examine academic achievement include measures of teacher skill, such as scores from teacher assessments, or specific teacher credentials, like certification in early childhood education. Analyses may take into account school characteristics such as the age of facilities or availability of community resources like libraries or computer labs. Other research provides for student characteristics like "grit," which is a measure of a student's innate willpower and likelihood for success (Duckworth, Kelly, Matthews, & Peterson, 2007). The regression models that I tested did not account for these variables, which may have reduced the r-squared values, indicating that the model was not fully specified.

However, the low r-squared values may also be a result of the use of test scores as a dependent variable. As discussed previously in the literature review, education systems can be seen as a production function, where a variety of education inputs are transformed into an education product. Test scores are a proxy value that can provide an indicator of students' academic knowledge and skills, but these scores may not account for the multiple outputs of the education system. Schools provide other outputs like career readiness, college readiness, and personal growth that are likely not accounted for in this model.

Funding Decisions Should be Made Based on Sensible Metrics that are Flexible Enough to Capture Non-Academic Outcomes

In addition to the significant issues with data collection and measurements of student success, this analysis also demonstrated the overall importance of spending in academic

outcomes. I found that expenditures consistently predicted test scores across multiple categories when the state separated these funds by their functional area. However, there were no clear links between academic success and program expenditures—such as bilingual education, athletics, or career and technical education. Since the expenditures by program did not provide a statistically significant relationship with academic achievement, it is tempting to conclude that these expenditures are a waste of funds and should be cut. This effect may already have occurred in California, when 32 programs were eliminated or consolidated as a part of the LCFF implementation. However, these conclusions may stem from misplaced measurements of program effects rather than wasteful spending.

While particular programs such as facility improvements, transportation supplements, or leadership training may have positive impacts on certain aspects of the education system, these programs may not have a direct effect on student achievement. As a result, it will be increasingly important for the state's education system to adopt new metrics to measure the effects of these programs without relying on academic outcomes. For example, the success of funding for facility improvements or school leadership activities may be better measured using surveys of parental satisfaction that are tailored to the a program's expected outcome.

Future Research Should Address a Meaningful Variation in Inputs, Use Natural Experiments, and Identify Multiple Dependent Variables

I identified some gaps in these regression analyses where future research may be warranted. The issues with heteroscedasticity and statistical significance may be reduced by using data from multiple years rather than a single year, additional data sources might be available with more detailed financial reporting, and regression analyses with different dependent variables might also yield other results.

One of the significant challenges of performing regression analyses on school finance is ensuring that there is enough variation in a data set to provide meaningful results. External pressures like best practices, accountability, and court interventions tend to cause education agencies to spend similar amounts on similar functions. Without significant variation, it can be hard to isolate the effects of expenditures. Research may address this issue by using a natural experiment that isolates changes in expenditures using a random event that affects all schools equally. In particular, looking data from a period when budget cuts, surplus revenues, or court interventions caused an equal reduction or increase in expenditures might provide better information on how spending choices affect student achievement. Another method might be to look at pilot programs or grant opportunities that randomly select participating schools and provide increased funding. These data sources would enable a regression analysis to report a stronger case for a cause and effect relationship between changes in expenditures and academic outcomes.

Future research might also look to multiple different dependent variables to assess the effect of expenditures on other outcomes in addition to test scores. Indicators such as surveys that comment on school climate, graduation rates, or career readiness will begin to be used by the California education system as metrics of school success. Regression studies using these indicators as dependent variables could link the effectiveness of particular types of spending to outcomes in these areas. These studies will become more important in the coming years, as schools are judged based on their ability to meet multiple accountability measures.

Conclusion

Overall, this work has provided a clear connection between school expenditures and academic achievement. Test scores are strongly linked to spending in functional areas such as

direct instruction, instruction related activities, and supportive services. In addition, schools with majority concentrations of minority students or students who are at risk of dropping out had a significantly different relationship between expenditures and exemplary performance than schools with majority White students or with no racial or ethnic majority. While the results indicate that increased expenditures tend to predict increases in test scores and an increased likelihood that a school is noted for exemplary performance, this analysis does not necessarily provide a clear causal link to show that expenditures influence test scores, since schools with higher test scores may be rewarded with additional funding.

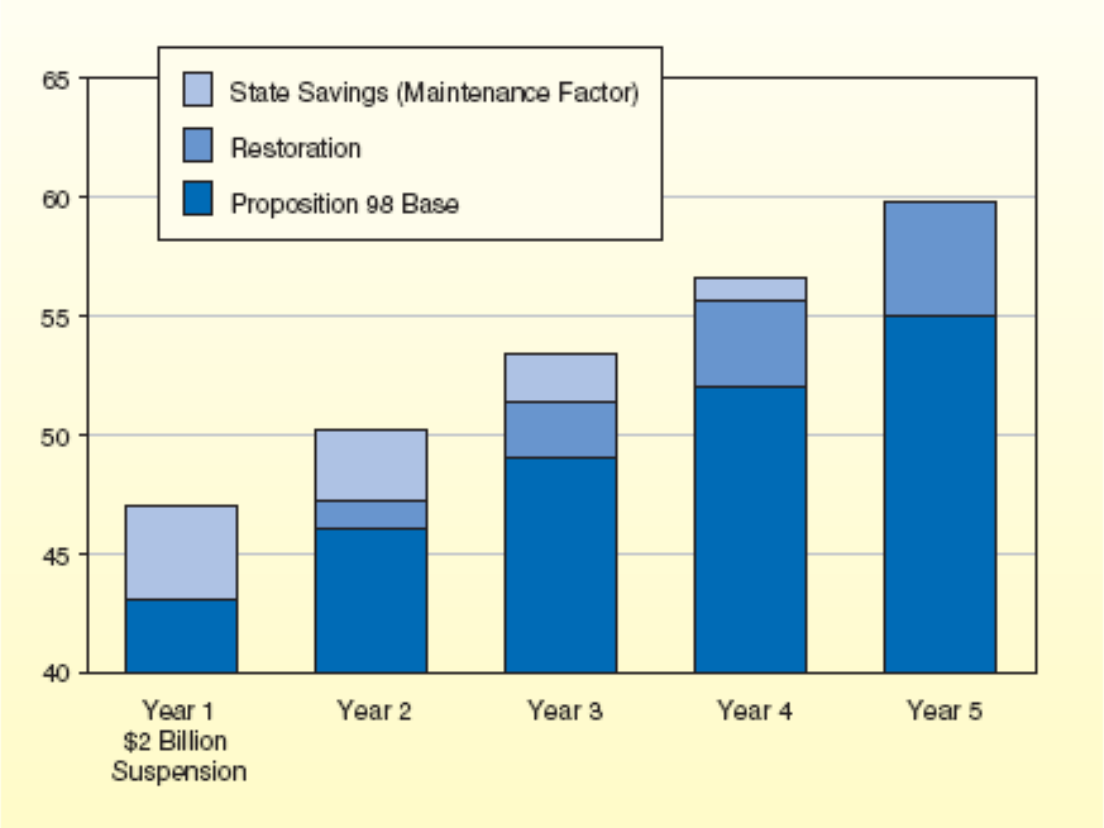
One critical problem with any analysis that focuses on standardized test scores is that the education system does not simply exist to produce these scores. Test scores may provide an important proxy for academic achievement, but education has greater purposes to give children the skills to participate in a democratic society as a citizen, to prepare students for future academic work in college, to provide career skills that lead to gainful employment, and to instill a life-long desire to learn and grow. Test scores, which compress these measures down to a single number, provide an inaccurate representation of the many outcomes of the education system.

There is no single universal standard of measurement that can stand in as an indicator of the various purposes of the education system and there is no one "right" way to allocate funding to improve these outcomes. With the opportunities afforded by the LCFF, educational agencies will be responsible for making their own financial decisions in a way that is calculated to maximize the areas of education that are a priority to local communities. As accountability measures change to accommodate multiple metrics, schools should also have some flexibility to align their finances, data, and reporting in a way that provides an accurate picture of how these schools plan to succeed, how they are performing, and how well they have met their goals. While it is clear that expenditures in the major functional areas affect academic achievement, future

research should take into account these new metrics and look for ways that expenditures are linked to expected outcomes. The complex interactions that occur between a variety of educational inputs and the production of multiple different academic, social, and personal outcomes cannot be compressed down to the results of one test or the report of a single number.

APPENDIX

FIGURE 1. How a Maintenance Factor is Created and Restored



SOURCE: Manwaring (2005)

FIGURE 2. Logic Model of Variable Relationships

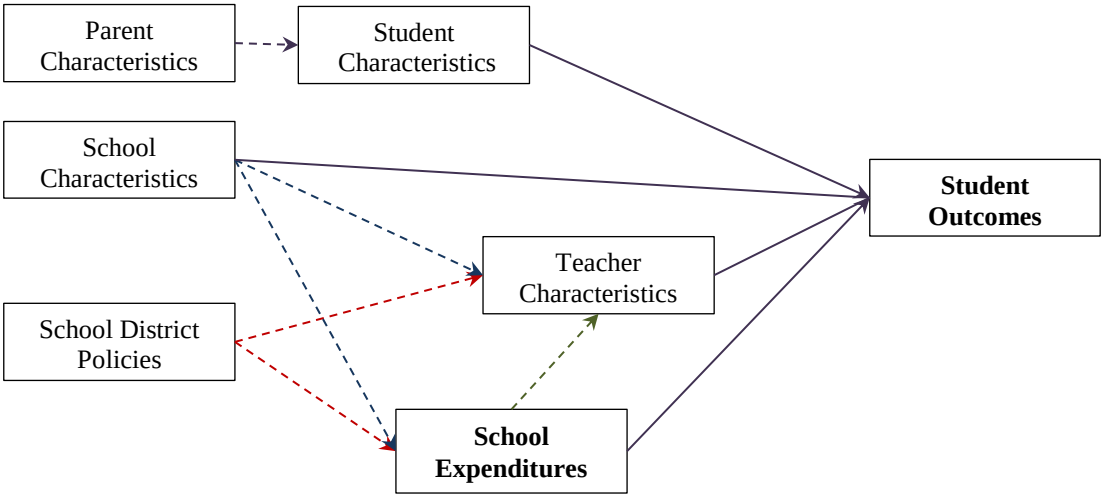


TABLE 1. Per-pupil Expenditures by State, Selected Years (1969-2011)

	1969-70		1979-80		1989-90		1999-2000		2009-10		2010-11
Alabama (AL)	3,332	AL	4,803	AL	6,062	AL	7,869	AL	10,198	AL	9,728
Alaska (AK)	6,875	AK	14,089	AK	15,362	AK	13,212	AK	18,520	AK	19,204
Arizona (AZ)	4,410	AZ	5,873	AZ	7,385	AZ	7,487	AZ	9,347	AZ	9,047
Arkansas (AR)	3,476	AR	4,692	AR	6,350	AR	7,691	AR	10,927	AR	10,811
California (CA)	**5,311**	**CA**	**6,758**	**CA**	**8,000**	**CA**	**8,747**	**CA**	**10,333**	**CA**	**9,983**
Colorado (CO)	4,519	CO	7,214	CO	8,601	CO	9,158	CO	10,405	CO	10,160
Connecticut (CT)	5,826	CT	7,212	CT	14,279	CT	13,832	CT	17,221	CT	17,718
Delaware (DE)	5,513	DE	8,526	DE	10,566	DE	12,038	DE	13,800	DE	13,842
District of Columbia (DC)	6,237	DC	9,712	DC	16,316	DC	16,310	DC	22,718	DC	22,293
Florida (FL)	4,485	FL	5,630	FL	9,105	FL	8,723	FL	9,995	FL	9,830
Georgia (GA)	3,601	GA	4,843	GA	7,789	GA	9,434	GA	10,520	GA	10,022
Hawaii (HI)	5,148	HI	6,919	HI	8,105	HI	9,689	HI	13,756	HI	13,188
Idaho (ID)	3,695	ID	4,945	ID	5,608	ID	7,713	ID	7,986	ID	7,487
Illinois (IL)	5,570	IL	7,708	IL	9,325	IL	11,047	IL	13,966	IL	13,792
Indiana (IN)	4,459	IN	5,610	IN	8,393	IN	10,457	IN	10,845	IN	10,385
Iowa (IA)	5,170	IA	6,933	IA	8,113	IA	9,464	IA	11,233	IA	11,431
Kansas (KS)	4,722	KS	6,476	KS	8,658	KS	9,514	KS	11,591	KS	11,415
Kentucky (KY)	3,339	KY	5,069	KY	6,824	KY	9,271	KY	11,076	KY	10,955
Louisiana (LA)	3,969	LA	5,340	LA	7,112	LA	8,549	LA	12,267	LA	12,034
Maine (ME)	4,241	ME	5,434	ME	9,790	ME	11,270	ME	15,040	ME	15,074
Maryland (MD)	5,624	MD	7,742	MD	11,434	MD	11,306	MD	15,945	MD	15,764
Massachusetts (MA)	5,261	MA	8,402	MA	11,364	MA	12,812	MA	15,619	MA	15,687
Michigan (MI)	5,536	MI	7,868	MI	10,106	MI	12,143	MI	12,448	MI	12,097
Minnesota (MN)	5,534	MN	7,113	MN	9,056	MN	10,248	MN	12,132	MN	11,896
Mississippi (MS)	3,067	MS	4,958	MS	5,637	MS	7,319	MS	9,254	MS	8,827
Missouri (MO)	4,339	MO	5,770	MO	8,212	MO	9,244	MO	11,174	MO	10,828
Montana (MT)	4,788	MT	7,380	MT	8,630	MT	9,552	MT	12,236	MT	12,137
Nebraska (NE)	4,510	NE	6,407	NE	8,822	NE	10,058	NE	12,724	NE	12,715
Nevada (NV)	4,713	NV	6,223	NV	7,502	NV	8,401	NV	9,468	NV	9,455
New Hampshire (NH)	4,428	NH	5,709	NH	9,664	NH	9,679	NH	14,329	NH	14,612
New Jersey (NJ)	6,224	NJ	9,511	NJ	14,830	NJ	14,899	NJ	19,278	NJ	18,474
New Mexico (NM)	4,330	NM	6,061	NM	6,404	NM	7,974	NM	10,371	NM	9,790
New York (NY)	8,126	NY	10,318	NY	14,688	NY	14,973	NY	21,312	NY	21,442
North Carolina (NC)	3,750	NC	5,228	NC	7,817	NC	8,890	NC	9,533	NC	8,886
North Dakota (ND)	4,223	ND	5,722	ND	7,633	ND	8,306	ND	11,717	ND	11,884
Ohio (OH)	4,471	OH	6,183	OH	9,191	OH	10,682	OH	13,137	OH	13,063
Oklahoma (OK)	3,702	OK	5,741	OK	6,391	OK	7,885	OK	9,085	OK	8,544
Oregon (OR)	5,663	OR	8,022	OR	9,974	OR	11,109	OR	11,182	OR	10,984
Pennsylvania (PA)	5,400	PA	7,554	PA	11,348	PA	11,452	PA	14,601	PA	14,725
Rhode Island (RI)	5,458	RI	7,751	RI	11,602	RI	13,183	RI	17,339	RI	17,105
South Carolina (SC)	3,751	SC	5,221	SC	7,437	SC	8,945	SC	10,554	SC	10,182
South Dakota (SD)	4,225	SD	5,685	SD	6,798	SD	8,250	SD	10,336	SD	9,869
Tennessee (TN)	3,467	TN	4,874	TN	6,675	TN	7,977	TN	9,404	TN	9,747
Texas (TX)	3,823	TX	5,709	TX	7,562	TX	9,254	TX	10,171	TX	9,856
Utah (UT)	3,835	UT	4,937	UT	5,036	UT	6,413	UT	7,340	UT	7,169
Vermont (VT)	4,944	VT	5,951	VT	11,345	VT	12,025	VT	17,705	VT	17,434
Virginia (VA)	4,335	VA	5,871	VA	8,512	VA	8,871	VA	12,150	VA	11,640
Washington (WA)	5,606	WA	7,653	WA	8,568	WA	9,448	WA	10,932	WA	10,885
West Virginia (WV)	4,103	WV	5,723	WV	7,945	WV	10,436	WV	13,213	WV	13,085
Wisconsin (WI)	5,406	WI	7,381	WI	10,064	WI	11,341	WI	13,017	WI	13,097
Wyoming (WY)	5,242	WY	7,530	WY	10,162	WY	10,856	WY	17,650	WY	17,922
United States	**$4,997**		**$6,770**		**$9,073**		**$10,104**		**$12,198**		**$11,948**

SOURCE: National Center for Education Statistics (2013)

TABLE 2. Per-pupil Expenditures by Amount, Selected Years (1969-2011)

1969-70		1979-80		1989-90		1999-2000		2009-10		2010-11	
New York (NY)	8,126	AK	14,089	DC	16,316	DC	16,310	DC	22,718	DC	22,293
Alaska (AK)	6,875	NY	10,318	AK	15,362	NY	14,973	NY	21,312	NY	21,442
District of Columbia (DC)	6,237	DC	9,712	NJ	14,830	NJ	14,899	NJ	19,278	AK	19,204
New Jersey (NJ)	6,224	NJ	9,511	NY	14,688	CT	13,832	AK	18,520	NJ	18,474
Connecticut (CT)	5,826	DE	8,526	CT	14,279	AK	13,212	VT	17,705	WY	17,922
Oregon (OR)	5,663	MA	8,402	RI	11,602	RI	13,183	WY	17,650	CT	17,718
Maryland (MD)	5,624	OR	8,022	MD	11,434	MA	12,812	RI	17,339	VT	17,434
Washington (WA)	5,606	MI	7,868	MA	11,364	MI	12,143	CT	17,221	RI	17,105
Illinois (IL)	5,570	RI	7,751	PA	11,348	DE	12,038	MD	15,945	MD	15,764
Michigan (MI)	5,536	MD	7,742	VT	11,345	VT	12,025	MA	15,619	MA	15,687
Minnesota (MN)	5,534	IL	7,708	DE	10,566	PA	11,452	ME	15,040	ME	15,074
Delaware (DE)	5,513	WA	7,653	WY	10,162	WI	11,341	PA	14,601	PA	14,725
Rhode Island (RI)	5,458	PA	7,554	MI	10,106	MD	11,306	NH	14,329	NH	14,612
Wisconsin (WI)	5,406	WY	7,530	WI	10,064	ME	11,270	IL	13,966	DE	13,842
Pennsylvania (PA)	5,400	WI	7,381	OR	9,974	OR	11,109	DE	13,800	IL	13,792
California (CA)	**5,311**	MT	7,380	ME	9,790	IL	11,047	HI	13,756	HI	13,188
Massachusetts (MA)	5,261	CO	7,214	NH	9,664	WY	10,856	WV	13,213	WI	13,097
Wyoming (WY)	5,242	CT	7,212	IL	9,325	OH	10,682	OH	13,137	WV	13,085
Iowa (IA)	5,170	MN	7,113	OH	9,191	IN	10,457	WI	13,017	OH	13,063
Hawaii (HI)	5,148	IA	6,933	FL	9,105	WV	10,436	NE	12,724	NE	12,715
Vermont (VT)	4,944	HI	6,919	MN	9,056	MN	10,248	MI	12,448	MT	12,137
Montana (MT)	4,788	**CA**	**6,758**	NE	8,822	NE	10,058	LA	12,267	MI	12,097
Kansas (KS)	4,722	KS	6,476	KS	8,658	HI	9,689	MT	12,236	LA	12,034
Nevada (NV)	4,713	NE	6,407	MT	8,630	NH	9,679	VA	12,150	MN	11,896
Colorado (CO)	4,519	NV	6,223	CO	8,601	MT	9,552	MN	12,132	ND	11,884
Nebraska (NE)	4,510	OH	6,183	WA	8,568	KS	9,514	ND	11,717	VA	11,640
Florida (FL)	4,485	NM	6,061	VA	8,512	IA	9,464	KS	11,591	IA	11,431
Ohio (OH)	4,471	VT	5,951	IN	8,393	WA	9,448	IA	11,233	KS	11,415
Indiana (IN)	4,459	AZ	5,873	MO	8,212	GA	9,434	OR	11,182	OR	10,984
New Hampshire (NH)	4,428	VA	5,871	IA	8,113	KY	9,271	MO	11,174	KY	10,955
Arizona (AZ)	4,410	MO	5,770	HI	8,105	TX	9,254	KY	11,076	WA	10,885
Missouri (MO)	4,339	OK	5,741	**CA**	**8,000**	MO	9,244	WA	10,932	MO	10,828
Virginia (VA)	4,335	WV	5,723	WV	7,945	CO	9,158	AR	10,927	AR	10,811
New Mexico (NM)	4,330	ND	5,722	NC	7,817	SC	8,945	IN	10,845	IN	10,385
Maine (ME)	4,241	NH	5,709	GA	7,789	NC	8,890	SC	10,554	SC	10,182
South Dakota (SD)	4,225	TX	5,709	ND	7,633	VA	8,871	GA	10,520	CO	10,160
North Dakota (ND)	4,223	SD	5,685	TX	7,562	**CA**	**8,747**	CO	10,405	GA	10,022
West Virginia (WV)	4,103	FL	5,630	NV	7,502	FL	8,723	NM	10,371	**CA**	**9,983**
Louisiana (LA)	3,969	IN	5,610	SC	7,437	LA	8,549	SD	10,336	SD	9,869
Utah (UT)	3,835	ME	5,434	AZ	7,385	NV	8,401	**CA**	**10,333**	TX	9,856
Texas (TX)	3,823	LA	5,340	LA	7,112	ND	8,306	AL	10,198	FL	9,830
South Carolina (SC)	3,751	NC	5,228	KY	6,824	SD	8,250	TX	10,171	NM	9,790
North Carolina (NC)	3,750	SC	5,221	SD	6,798	TN	7,977	FL	9,995	TN	9,747
Oklahoma (OK)	3,702	KY	5,069	TN	6,675	NM	7,974	NC	9,533	AL	9,728
Idaho (ID)	3,695	MS	4,958	NM	6,404	OK	7,885	NV	9,468	NV	9,455
Georgia (GA)	3,601	ID	4,945	OK	6,391	AL	7,869	TN	9,404	AZ	9,047
Arkansas (AR)	3,476	UT	4,937	AR	6,350	ID	7,713	AZ	9,347	NC	8,886
Tennessee (TN)	3,467	TN	4,874	AL	6,062	AR	7,691	MS	9,254	MS	8,827
Kentucky (KY)	3,339	GA	4,843	MS	5,637	AZ	7,487	OK	9,085	OK	8,544
Alabama (AL)	3,332	AL	4,803	ID	5,608	MS	7,319	ID	7,986	ID	7,487
Mississippi (MS)	3,067	AR	4,692	UT	5,036	UT	6,413	UT	7,340	UT	7,169
United States	**$4,997**		**$6,770**		**$9,073**		**$10,104**		**$12,198**		**$11,948**

SOURCE: National Center for Education Statistics (2013)

TABLE 3. Categorical Programs After the LCFF

Retained Programs	
• Adults in Correctional Facilities • After School Education and Safety • Agricultural Vocational Education • American Indian Education Centers and Early Childhood Education Program • Assessments • Child Nutrition	• Foster Youth Services • Mandates Block Grant • Partnership Academies • Quality Education Improvement Act • Special Education • Specialized Secondary Programs • State Preschool
Eliminated Programs	
• Advanced Placement Fee Waiver • Alternative Credentialing • California High School Exit Exam Tutoring • California School Age Families • Categorical Programs for New Schools • Certificated Staff Mentoring • Charter School Block Grant • Civic Education • Community–Based English Tutoring • Community Day School (extra hours) • Deferred Maintenance • Economic Impact Aid • Educational Technology • Gifted and Talented Education • Grade 7–12 Counseling • High School Class Size Reduction • Instructional Materials Block Grant	• International Baccalaureate Diploma Program • National Board Certification Incentives • Oral Health Assessments • Physical Education Block Grant • Principal Training • Professional Development Block Grant • Professional Development for Math and English • School and Library Improvement Block Grant • School Safety • School Safety Competitive Grant • Staff Development • Student Councils • Summer School Programs • Teacher Credentialing Block Grant • Teacher Dismissal

SOURCE: Cabral & Chu (2013)

TABLE 4. Summary of Estimated Expenditure Parameter Coefficients from 187 Studies of Education Production Functions

Input	Number of studies	Statistically significant		Statistically insignificant			
		+	-	Total	+	-	Unknown sign
Teacher/pupil ratio	152	14	13	125	34	46	45
Teacher education	113	8	5	100	31	32	37
Teacher experience	140	40	10	90	44	31	15
Teacher salary	69	11	4	54	16	14	24
Expenditures/pupil	65	13	3	49	25	13	11
Administrative inputs	61	7	1	53	14	15	24
Facilities	74	7	5	62	17	14	31

SOURCE: Hanushek (1989)

TABLE 5. The Effect of $500 [a] Per Student on Achievement.

	Sample	
Input variable	**Full analysis [b]**	**Publication bias robustness [b]**
Per-pupil expenditure	0.15	0.15
Teacher education	0.22	0.20
Teacher experience	0.18	0.17
Teacher salary	0.16	0.08
Teacher/pupil ratio	0.04	0.04

[a] In 1993-94 dollars
[b] In standard deviation units

SOURCE: Greenwald, Hedges, & Laine (1996)

TABLE 6. School-Site Micro-Financial Allocations Model

Central Office	**School Site**
Function A *Administration* Superintendent, Staff, offices, supervisors, directors, including salaries plus fringe benefits	*Function a* *Administration* Principal, Assistants, secretaries, Office expenses, salaries plus fringe benefits.
Function B *Facilities and Operations* Central Office buildings, light, heat, air conditioning, repairs, maintenance upkeep, plus the cost of coordinating and running the facilities and operations. Salaries and frindge benefits for operation management staff at Central	*Function b* *Facilities and Operations* School-site building costs, including utilities, repairs and custodial costs, bus services, food services.
Function C *Staff Support and Development* Planning, coordinating and directing the teacher in-service education, staff training director and staff who work out of the Central Office.	*Function c* *Staff Support and Development* Delivery of school-site staff development, mentoring, coaching, sabbatical leaves, other teacher support efforts.
Function D *Pupil Support* Coordination and direction of student support functions. Salaries and fringe benefits, office and secretary for the Pupil Personnel and support functions psychologists and others who direct and coordinate student services.	*Function d* *Pupil Support* Out-of-classroom student support, including school guidance counselors, media and library staff, coaches, club leaders, and others who work with students. Salaries and fringe benefits. Plus offices.
Function E *Instruction* Coodinators and directors of instructional programs who provide services to teachers in their classrooms. Costs of supporting instruction, such as screening textbooks, writing teasts and materials.	*Function e* *Instruction* Teacher salaries and fringe benefits for work done in the classroom. Plus other classroom staff costs including teaching aides, paraprofessionals; Textbooks, materials, computers used in classrooms, paper, chalk and other disposables.

SOURCE: Alfano, et al. (1994)

TABLE 7. Regression Variables and Summary Statistics

Variable Group	Variable Description	# of Obs.	Mean	Std. Dev.	Min	Max
Expenditures by Function (In Thousands of Dollars)	Instruction	7,523	53.5434	25.9950	0	624.52
	Instruction Related	7,520	2.5363	1.6887	0	33.91
	Instructional Leadership	7,522	0.8542	0.8254	0	9.93
	Other	7,521	8.3896	7.3869	0	96.11
	School Leadership	7,522	5.8385	6.8387	0	239.88
	Supportive Services	7,522	3.7376	4.8028	0	213.6
	Total Operating	7,523	74.7996	36.4446	0.8100	855.32
Expenditures by Program (In Thousands of Dollars)	Athletics	7,523	0.0002	0.0033	0	0.09
	Bilingual	7,518	2.2694	4.8404	0	78.22
	Career and Technical Education	7,520	1.8889	4.3790	0	76.72
	Compensatory	7,522	9.3881	14.1073	0	609.39
	GATE	7,515	0.6672	1.2338	0	9.91
	High School Allotment	7,523	0.5309	2.1194	0	95.03
	Other	7,523	2.2294	20.4816	0	706.44
	Regular	7,522	39.5344	16.6174	0	743.63
	Special Education	7,521	9.4803	20.0504	0	845.72
	Total Funds	7,523	65.9948	34.1309	0	881.82
Staff Salaries (In Hundreds of Dollars)	Avg. Administrative Staff Salary	7,313	699.6839	104.2326	100.6500	999.13
	Average Support Staff Salary	7,112	532.4755	73.1649	83.9800	941.92
	Average Teacher Salary 1 to 5 Years Experience	7,379	423.0691	54.9840	101.1300	658.58
	Average Teacher Salary 11 to 20 Years Experience	7,310	497.7511	42.4377	109.1000	882
	Average Teacher Salary 6 to 10 Years Experience	7,286	452.4406	46.6715	97.5000	874.49
	Average Teacher Salary All Teachers	7,522	475.3864	47.6180	203.6400	675.93
	Average Teacher Salary New Teachers	5,842	407.1538	67.1172	0.7000	933.62
	Average Teacher Salary Over 20 Years Experience	7,164	575.5097	62.6192	113.5300	949.54
Student Demographics	Majority African American (Dummy)	7,567	0.0466	0.2109	0	1
	Majority African American and Latino/a (Dummy)	7,567	0.5540	0.4971	0	1
	Majority Asian American (Dummy)	7,567	0.0024	0.0487	0	1
	Majority At-Risk (Dummy)	7,567	0.3617	0.4805	0	1
	Majority Economically Disadvantaged (Dummy)	7,567	0.5745	0.4945	0	1
	Majority English Language Learners (Dummy)	7,567	0.0854	0.2795	0	1
	Majority Latino/a (Dummy)	7,567	0.4316	0.4953	0	1

Variable Group	Variable Description	# of Obs.	Mean	Std. Dev.	Min	Max
Student Demographics (cont.)	Majority Native American (Dummy)	7,567	0.0000	0.0000	0	0
	Majority White (Dummy)	7,567	0.3462	0.4758	0	1
	Percentage African American	7,567	12.2807	17.0640	0	100
	Percentage Asian American	7,567	2.5557	5.6940	0	76.6
	Percentage At-Risk	7,567	47.2770	22.2480	0	100
	Percentage Bilingual	7,567	15.2106	18.9791	0	100
	Percentage Career and Technical Education	7,567	16.7786	28.7041	0	100
	Percentage DAEP	7,567	1.3828	2.5738	0	100
	Percentage Economically Disadvantaged	7,567	61.0959	26.3265	0	100
	Percentage GATE	7,567	6.9048	7.1555	0	100
	Percentage Hispanic	7,567	47.8567	30.7017	0	100
	Percentage Limited English Proficiency	7,567	15.8569	19.2725	0	100
	Percentage Native American	7,567	0.5071	1.1351	0	33.9
	Percentage Pacific Islander	7,567	0.1207	0.5063	0	15.9
	Percentage Special Education	7,567	9.5422	6.9549	0	100
	Percentage Two or More Races	7,567	1.5539	1.5842	0	25
	Percentage White	7,567	35.1255	29.0639	0	100
Teacher Demographics	Average Teacher Experience (In Years)	7,522	11.4802	3.4032	0	39
	Average Teacher Tenure (In Years)	7,522	7.7202	3.0466	0	26
	Average Teacher-Student Ratio	7,515	14.1676	3.1629	0.3530	50
Class Size	Grade 3 - Average Class Size	4,135	18.2357	3.9010	1	46.2
	Grade 4 - Average Class Size	4,109	18.4529	4.0735	1	43.5
	Grade 5 - Average Class Size	3,824	20.2843	5.3340	1	48.9
	Grade 6 - Average Class Size	2,331	18.8828	5.9952	1	49.5
Campus Type	Charter Campus (Dummy)	7,567	0.0548	0.2277	0	1
	Rural Campus (Dummy)	7,567	0.2880	0.4528	0	1
	Suburban Campus (Dummy)	7,567	0.3673	0.4821	0	1
	Urban Campus (Dummy)	7,567	0.2899	0.4538	0	1
TAKS Average Test Score (Scaled)	Grade 3 - Math	4,142	589.1963	36.4742	399	758
	Grade 3 - Reading	4,142	604.0893	38.8021	393	742
	Grade 4 - Math	4,158	647.2210	72.5806	0	789
	Grade 4 - Reading	4,173	624.9305	119.8420	0	782
	Grade 4 - Writing	4,158	2,264.0730	363.3351	0	2,646
	Grade 5 - Math	3,902	691.4326	92.2194	0	828
	Grade 5 - Reading	3,902	699.6976	91.5383	0	834
	Grade 5 - Science	3,902	2,298.5030	299.3659	0	2,610
	Grade 6 - Math	2,277	703.2007	114.1258	0	874

Variable Group	Variable Description	# of Obs.	Mean	Std. Dev.	Min	Max
TAKS Average Test Score (Scaled) (cont.)	Grade 6 - Reading	2,277	714.0382	113.4269	0	871
	Grade 7 - Math	1,970	712.3934	133.7932	0	895
	Grade 7 - Reading	1,970	736.6056	136.4814	0	957
	Grade 7 - Writing	1,971	2,293.6960	424.1615	0	2,791
	Grade 8 - History	1,931	2,334.1910	86.5976	1,985	2,818
	Grade 8 - Math	1,926	766.0784	39.3354	555	948
	Grade 8 - Reading	1,928	811.7080	37.9878	596	939
	Grade 8 - Science	1,932	2,252.1690	108.9637	1,663	2,650
	Grade 9 - Math	1,679	2,191.9140	124.6569	1,670	2,734
	Grade 9 - Reading	1,688	2,268.8740	91.6453	1,867	2,671
	Grade 10 - History	1,642	2,321.4170	88.3626	1,965	2,643
	Grade 10 - Math	1,646	2,176.6490	85.2748	1,875	2,553
	Grade 10 - Reading	1,665	2,254.5710	60.2675	1,996	2,500
	Grade 10 - Science	1,643	2,184.9290	86.1592	1,889	2,524
	Grade 11 - History	1,612	2,383.9730	70.8137	2,125	2,657
	Grade 11 - Math	1,607	2,266.4700	79.3063	2,006	2,587
	Grade 11 - Reading	1,611	2,291.4670	58.0316	1,957	2,489
	Grade 11 - Science	1,609	2,264.3470	69.2159	2,016	2,542

TABLE 8. Statistically Significant OLS Regression Results

Group	Variable	Grade	Test	Regr. Coef.
Expenditures by Function	Instruction	8	Science	10.8242***
		3	Reading	5.8903***
		3	Math	5.2361**
		8	Reading	4.8538***
		8	History	4.2939**
		9	Reading	3.2390**
		10	History	2.8938**
		10	Science	2.3712**
		10	Math	2.1209*
		10	Reading	1.8920**
		11	Math	1.8336*
		11	History	1.7561*
		11	Science	1.5965*
		7	Math	-2.8797**
		7	Reading	-3.0393**
		7	Writing	-10.8115***
	Instruction Related	8	Science	11.2771***
		3	Math	5.3866**
		3	Reading	5.2586**
		8	Reading	5.1259***
		8	History	5.1195**
		9	Reading	4.8774***
		10	History	3.9006**
		10	Science	2.8513**
		11	History	2.5498*
		10	Reading	1.9127*
	Instructional Leadership	3	Reading	7.1685***
		3	Math	6.8731***
		8	Science	6.1434**
		10	History	5.5370***
		10	Science	4.0387**
		8	Reading	3.8456***
		10	Reading	3.3426***
	Other	8	Science	11.1452***
		3	Reading	5.6669***
		3	Math	5.2674**
		8	Reading	4.9701***
		8	History	4.7673**
		9	Reading	3.4135**
		10	History	2.5090*
		10	Science	2.2048*
		10	Reading	1.7640**
		7	Reading	-2.3910*

Group	Variable	Grade	Test	Regr. Coef.
	Other (cont.)	7	Math	-2.4950 **
		7	Writing	-8.8955 **
	School Leadership	8	Science	10.5918 ***
		3	Reading	4.7932 **
		8	Reading	4.5508 ***
		8	History	4.5247 **
		3	Math	4.2648 *
		9	Reading	3.1481 *
		10	History	2.4602 *
		7	Math	-3.8189 **
		7	Reading	-4.3146 ***
		6	Reading	-5.5826 *
		6	Math	-8.0086 ***
		5	Reading	-10.5560 **
		5	Math	-12.1570 ***
		7	Writing	-16.1218 ***
		5	Science	-34.6221 **
Expenditures by Function (cont.)	Supportive Services	8	Science	9.6200 ***
		3	Reading	5.8397 ***
		3	Math	5.6168 **
		8	History	3.9878 *
		8	Reading	3.8039 ***
		7	Reading	-3.8359 **
		7	Math	-4.4520 ***
		7	Writing	-12.4069 **
	Total Operating	7	Writing	9.0026 **
		7	Reading	2.4014 *
		7	Math	2.2484 *
		10	Reading	-1.6933 **
		10	Science	-2.1949 *
		10	History	-2.7631 **
		9	Reading	-3.2216 **
		8	History	-4.4196 **
		8	Reading	-4.7738 ***
		3	Math	-5.2327 **
		3	Reading	-5.7192 ***
		8	Science	-10.7626 ***
Campus Type	Charter Campus	6	Reading	19.8855 **
		6	Math	19.0029 **
		8	Reading	7.9079 ***
		11	Science	-15.0557 ***
		10	History	-19.9205 ***
		11	History	-22.7115 ***
		5	Reading	-30.2964 ***
		4	Math	-39.9200 ***

Group	Variable	Grade	Test	Regr. Coef.
Campus Type (cont.)	Charter Campus (cont.)	5	Math	-43.1941***
		4	Reading	-76.7595***
		5	Science	-136.7326***
		4	Writing	-230.4500***
	Rural Campus	6	Reading	8.8716*
		6	Math	8.5767*
		3	Reading	-6.4379***
		3	Math	-7.3153***
		4	Math	-8.1090***
		9	Reading	-9.4375**
		8	Science	-9.7671*
		11	Math	-12.1621***
		8	History	-13.2671***
		10	Reading	-13.5372***
		11	Science	-14.8050***
		9	Math	-19.3763***
		10	Math	-21.0244***
		11	History	-22.5959***
		10	Science	-24.4161***
		10	History	-35.9733***
		4	Reading	-44.3370***
		4	Writing	-130.7467***
	Suburban Campus	5	Science	13.9635*
		7	Math	13.8524*
		8	Science	10.8682**
		8	History	7.0637*
		8	Math	4.6189***
		3	Math	2.1668*
		10	Science	-6.9238*
		10	History	-8.2342*
		4	Reading	-15.6508***
		4	Writing	-49.7292***
Class Size	Grade 4 - Average Class Size	4	Writing	4.4689***
		4	Math	2.4484***
		4	Reading	1.7485***
	Grade 5 - Average Class Size	5	Science	7.1455***
		5	Reading	2.0701***
		5	Math	2.0509***
	Grade 6 - Average Class Size	6	Math	2.8918***
		6	Reading	2.6595***
Student Demographics	Percentage African American	9	Reading	-31.3097*
		9	Math	-43.7001*
	Percentage At-Risk	3	Math	-0.3706***
		3	Reading	-0.3876***
		4	Reading	-0.4775***

Group	Variable	Grade	Test	Regr. Coef.
Student Demographics (cont.)	Percentage At-Risk (cont.)	4	Math	-0.6162***
		5	Reading	-0.6700***
		6	Reading	-0.7122***
		5	Math	-0.8455***
		6	Math	-0.9106***
		8	Reading	-0.9557***
		8	Math	-1.0768***
		11	Reading	-1.1653***
		4	Writing	-1.3257***
		10	Reading	-1.3576***
		11	History	-1.4236***
		11	Science	-1.5613***
		9	Reading	-1.9615***
		10	Science	-2.0483***
		11	Math	-2.0789***
		10	Math	-2.1563***
		10	History	-2.1890***
		7	Reading	-2.1975***
		7	Math	-2.2025***
		8	History	-2.2735***
		5	Science	-2.6987***
		8	Science	-3.0200***
		9	Math	-3.2116***
		7	Writing	-5.8091***
	Percentage Bilingual	11	Science	2.3042*
		8	Science	1.6875**
		8	Math	0.5787**
		8	Reading	0.5188**
	Percentage Career and Technical Education	4	Writing	3.5491***
		4	Reading	0.9094***
		10	Math	0.1088*
		8	Reading	-0.0610***
		11	Science	-0.0849*
		11	History	-0.0943*
		8	Math	-0.1542***
		3	Reading	-0.2320***
		3	Math	-0.2410***
		4	Math	-0.2856*
		5	Reading	-0.3103*
		8	History	-0.3237***
		5	Math	-0.3414**
		8	Science	-0.4618***
		5	Science	-1.4152**
	Percentage DAEP	7	Writing	10.0198***
		7	Reading	5.0641***

Group	Variable	Grade	Test	Regr. Coef.
Student Demographics (cont.)	Percentage DAEP (cont.)	7	Math	3.0431***
		8	Reading	-0.4201*
		8	Math	-0.7268***
		11	Math	-1.0411*
		4	Math	-3.5349**
		3	Math	-5.0060***
		3	Reading	-5.1724***
		5	Reading	-5.3172***
		5	Math	-5.7776***
		5	Science	-15.6525***
		4	Reading	-28.1444***
		4	Writing	-80.8266***
	Percentage Econ. Disadvantaged	7	Writing	2.1678***
		7	Math	0.7378***
		7	Reading	0.6897***
		5	Science	0.4614*
		5	Math	-0.1377*
		5	Reading	-0.1526*
		8	Math	-0.1797***
		10	Math	-0.1846**
		9	Reading	-0.2052**
		10	Reading	-0.2069***
		11	Math	-0.2208**
		10	Science	-0.2302***
		6	Reading	-0.2534**
		8	Reading	-0.2617***
		10	History	-0.3122***
		11	Reading	-0.3603***
		11	Science	-0.4306***
		8	History	-0.4420***
		11	History	-0.4424***
		4	Math	-0.4635***
		3	Math	-0.5343***
		8	Science	-0.5430***
		3	Reading	-0.6357***
		4	Reading	-0.8078***
		4	Writing	-1.4916***
	Percentage GATE	7	Writing	3.8343***
		9	Math	2.6651***
		5	Science	2.1899***
		10	Math	1.9704***
		10	Science	1.6666***
		11	Math	1.6560***
		9	Reading	1.6350***
		8	Science	1.5295***

Group	Variable	Grade	Test	Regr. Coef.
Student Demographics (cont.)	Percentage GATE (cont.)	7	Reading	1.5287***
		7	Math	1.5167***
		11	Science	1.5081***
		10	History	1.4938***
		11	History	1.2319***
		10	Reading	1.0606***
		11	Reading	1.0336***
		8	History	1.0198***
		6	Reading	1.0161***
		6	Math	0.9952***
		4	Math	0.8983***
		3	Reading	0.8348***
		5	Math	0.8187***
		5	Reading	0.7609***
		3	Math	0.6900***
		8	Reading	0.5182***
		8	Math	0.5025***
		4	Reading	-0.7139**
		4	Writing	-2.7448***
	Percentage Hispanic	9	Math	-43.2556*
	Percentage Limited English Proficiency	4	Math	0.6500***
		3	Math	0.2882**
		8	Reading	-0.5737**
	Percentage Native American	9	Math	-44.5638*
	Percentage Pacific Islander	8	Math	14.0191*
	Percentage Special Education	8	Math	-0.4104***
		11	History	-0.4708**
		11	Science	-0.5899***
		8	Reading	-0.6164***
		10	Math	-0.6367***
		8	Science	-0.7800***
		8	History	-0.8079***
		10	History	-0.8413***
		11	Math	-0.9212***
		10	Science	-0.9657***
		11	Reading	-1.0225***
		10	Reading	-1.0320***
		9	Math	-1.2610***
		6	Math	-1.2829***
		6	Reading	-1.6453***
		9	Reading	-1.6844***
		4	Math	-2.2885***
		7	Math	-2.5324***
		5	Math	-2.6873***
		7	Reading	-2.8314***

Group	Variable	Grade	Test	Regr. Coef.
Student Demographics (cont.)	Percentage Special Education (cont.)	5	Reading	-2.9546***
		4	Reading	-3.3369***
		5	Science	-10.6174***
		7	Writing	-10.9731***
		4	Writing	-15.0460***
	Percentage Two or More Races	9	Math	-41.9768*
	Percentage White	9	Math	-42.9594*
Teacher Demographics	Average Teacher Experience	5	Science	4.4291***
		6	Reading	2.3657***
		6	Math	2.1247***
		5	Reading	1.4168***
		5	Math	1.3972***
		4	Math	1.2678***
		4	Reading	1.0006*
		3	Reading	0.8670***
		11	Reading	0.6693**
		3	Math	0.5179***
		11	Science	-0.7391**
		10	Science	-0.8857**
		10	History	-0.9691**
		11	History	-1.0553**
		9	Math	-1.4082**

TABLE 9-1. OLS Regression Results – Grade 3, Math

Grade	3
Test	Math
Number of Observations	4,086
R-Squared	0.4026
Adjusted R-Squared	0.3987

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	5.2361	2.2254	0.019	0.8730	9.5991
Exp. by Funct. – Instruction Related	5.3866	2.2426	0.016	0.9899	9.7833
Exp. by Funct. – Instructional Leadership	6.8731	2.3941	0.004	2.1793	11.5668
Exp. by Funct. – Other	5.2674	2.2316	0.018	0.8922	9.6426
Exp. by Funct. – School Leadership	4.2648	2.2726	0.061	-0.1908	8.7203
Exp. by Funct. – Supportive Services	5.6168	2.2846	0.014	1.1377	10.0959
Exp. by Funct. – Total Operating Funds	-5.2327	2.2257	0.019	-9.5962	-0.8691
Student Dem. – Percent African-American	5.2989	6.1680	0.390	-6.7937	17.3915
Student Dem. – Percent Asian-American	5.9185	6.1662	0.337	-6.1707	18.0077
Student Dem. – Percent Hispanic	5.4081	6.1676	0.381	-6.6837	17.4999
Student Dem. – Percent Native American	4.3798	6.1783	0.478	-7.7331	16.4926
Student Dem. – Percent Pacific Islander	5.7885	6.2713	0.356	-6.5067	18.0837
Student Dem. – Percent Two-race	5.4508	6.1806	0.378	-6.6665	17.5682
Student Dem. – Percent White	5.4514	6.1673	0.377	-6.6398	17.5426
Campus Type – Charter Campus	-4.6906	3.0871	0.129	-10.7430	1.3618
Campus Type – Rural Campus	-7.3153	1.5210	0.000	-10.2973	-4.3332
Campus Type – Suburban Campus	2.1668	1.1500	0.060	-0.0878	4.4214
Teacher Dem. – Avg. Teacher Experience	0.5179	0.1692	0.002	0.1863	0.8496
Student Dem. – Percent At-risk	-0.3706	0.0424	0.000	-0.4537	-0.2875
Student Dem. – Percent Bilingual	0.0958	0.1365	0.483	-0.1719	0.3635
Student Dem. – Percent Career & Technical Ed.	-0.2410	0.0900	0.007	-0.4174	-0.0645
Student Dem. – Percent DAEP	-5.0060	1.0062	0.000	-6.9786	-3.0333
Student Dem. – Percent Econ. Disadvantaged	-0.5343	0.0353	0.000	-0.6036	-0.4650
Student Dem. – Percent GATE	0.6900	0.0841	0.000	0.5251	0.8548
Student Dem. – Percent LEP	0.2882	0.1398	0.039	0.0142	0.5623
Student Dem. – Percent Special Ed.	0.0866	0.1624	0.594	-0.2317	0.4049
Class Size - Grade 3 Avg. Class Size	0.0795	0.1358	0.558	-0.1868	0.3458
Constant	81.9833	616.7387	0.894	-1127.1630	1291.1300

TABLE 9-2. OLS Regression Results – Grade 3, Reading

Grade	3
Test	Reading
Number of Observations	4,086
R-Squared	0.5012
Adjusted R-Squared	0.4978

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	5.8903	2.1666	0.007	1.6426	10.1380
Exp. by Funct. – Instruction Related	5.2586	2.1833	0.016	0.9782	9.5391
Exp. by Funct. – Instructional Leadership	7.1685	2.3308	0.002	2.5989	11.7381
Exp. by Funct. – Other	5.6669	2.1726	0.009	1.4074	9.9263
Exp. by Funct. – School Leadership	4.7932	2.2125	0.030	0.4554	9.1309
Exp. by Funct. – Supportive Services	5.8397	2.2242	0.009	1.4791	10.2003
Exp. by Funct. – Total Operating Funds	-5.7192	2.1668	0.008	-9.9673	-1.4710
Student Dem. – Percent African-American	-0.3517	6.0048	0.953	-12.1245	11.4211
Student Dem. – Percent Asian-American	0.1680	6.0031	0.978	-11.6014	11.9374
Student Dem. – Percent Hispanic	-0.2287	6.0044	0.970	-12.0007	11.5433
Student Dem. – Percent Native American	-1.1386	6.0149	0.850	-12.9310	10.6539
Student Dem. – Percent Pacific Islander	-0.2475	6.1054	0.968	-12.2174	11.7225
Student Dem. – Percent Two-race	-0.0154	6.0171	0.998	-11.8122	11.7814
Student Dem. – Percent White	-0.1325	6.0041	0.982	-11.9040	11.6389
Campus Type – Charter Campus	2.0233	3.0054	0.501	-3.8691	7.9156
Campus Type – Rural Campus	-6.4379	1.4808	0.000	-9.3411	-3.5347
Campus Type – Suburban Campus	1.3213	1.1196	0.238	-0.8736	3.5163
Teacher Dem. – Avg. Teacher Experience	0.8670	0.1647	0.000	0.5441	1.1899
Student Dem. – Percent At-risk	-0.3876	0.0413	0.000	-0.4685	-0.3067
Student Dem. – Percent Bilingual	0.1563	0.1329	0.240	-0.1043	0.4169
Student Dem. – Percent Career & Technical Ed.	-0.2320	0.0876	0.008	-0.4037	-0.0602
Student Dem. – Percent DAEP	-5.1724	0.9796	0.000	-7.0929	-3.2520
Student Dem. – Percent Econ. Disadvantaged	-0.6357	0.0344	0.000	-0.7031	-0.5682
Student Dem. – Percent GATE	0.8348	0.0819	0.000	0.6742	0.9953
Student Dem. – Percent LEP	0.1212	0.1361	0.373	-0.1456	0.3879
Student Dem. – Percent Special Ed.	-0.1225	0.1581	0.438	-0.4324	0.1873
Class Size - Grade 3 Avg. Class Size	0.0255	0.1322	0.847	-0.2338	0.2847
Constant	661.4766	600.4259	0.271	-515.6876	1838.6410

TABLE 9-3. OLS Regression Results – Grade 4, Math

Grade	4
Test	Math
Number of Observations	4091
R-Squared	0.4143
Adjusted R-Squared	0.4104

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.5910	3.8727	0.879	-7.0016	8.1837
Exp. by Funct. – Instruction Related	4.3471	3.9093	0.266	-3.3171	12.0114
Exp. by Funct. – Instructional Leadership	1.0282	4.1241	0.803	-7.0572	9.1137
Exp. by Funct. – Other	1.3650	3.8849	0.725	-6.2516	8.9816
Exp. by Funct. – School Leadership	-3.3564	3.9234	0.392	-11.0485	4.3357
Exp. by Funct. – Supportive Services	-0.3554	3.9472	0.928	-8.0941	7.3833
Exp. by Funct. – Total Operating Funds	-1.1479	3.8739	0.767	-8.7428	6.4471
Student Dem. – Percent African-American	-3.3786	10.7517	0.753	-24.4578	17.7006
Student Dem. – Percent Asian-American	-2.8359	10.7490	0.792	-23.9098	18.2381
Student Dem. – Percent Hispanic	-3.3240	10.7512	0.757	-24.4021	17.7542
Student Dem. – Percent Native American	-4.9514	10.7728	0.646	-26.0720	16.1692
Student Dem. – Percent Pacific Islander	-2.8035	10.9290	0.798	-24.2303	18.6232
Student Dem. – Percent Two-race	-3.0792	10.7733	0.775	-24.2007	18.0423
Student Dem. – Percent White	-3.2922	10.7506	0.759	-24.3692	17.7848
Campus Type – Charter Campus	-39.9200	5.1953	0.000	-50.1056	-29.7344
Campus Type – Rural Campus	-8.1090	2.6387	0.002	-13.2824	-2.9357
Campus Type – Suburban Campus	0.6201	2.0040	0.757	-3.3087	4.5490
Teacher Dem. – Avg. Teacher Experience	1.2678	0.2935	0.000	0.6924	1.8433
Student Dem. – Percent At-risk	-0.6162	0.0731	0.000	-0.7594	-0.4729
Student Dem. – Percent Bilingual	-0.0452	0.2397	0.850	-0.5152	0.4248
Student Dem. – Percent Career & Technical Ed.	-0.2856	0.1503	0.058	-0.5803	0.0091
Student Dem. – Percent DAEP	-3.5349	1.6153	0.029	-6.7017	-0.3680
Student Dem. – Percent Econ. Disadvantaged	-0.4635	0.0604	0.000	-0.5820	-0.3451
Student Dem. – Percent GATE	0.8983	0.1415	0.000	0.6210	1.1757
Student Dem. – Percent LEP	0.6500	0.2460	0.008	0.1678	1.1323
Student Dem. – Percent Special Ed.	-2.2885	0.2442	0.000	-2.7673	-1.8096
Class Size - Grade 4 Avg. Class Size	2.4484	0.2197	0.000	2.0177	2.8791
Constant	1027.1640	1075.1070	0.339	-1080.6350	3134.9620

TABLE 9-4. OLS Regression Results – Grade 4, Reading

Grade	4
Test	Reading
Number of Observations	4,096
R-Squared	0.2146
Adjusted R-Squared	0.2094

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.9347	5.9768	0.876	-10.7832	12.6526
Exp. by Funct. – Instruction Related	4.7116	6.0739	0.438	-7.1965	16.6197
Exp. by Funct. – Instructional Leadership	-2.4255	6.5898	0.713	-15.3450	10.4941
Exp. by Funct. – Other	0.8791	6.0086	0.884	-10.9011	12.6593
Exp. by Funct. – School Leadership	-5.7043	6.1516	0.354	-17.7648	6.3562
Exp. by Funct. – Supportive Services	-5.9740	6.2495	0.339	-18.2264	6.2784
Exp. by Funct. – Total Operating Funds	-0.6075	5.9902	0.919	-12.3515	11.1366
Student Dem. – Percent African-American	-6.3370	21.9600	0.773	-49.3907	36.7166
Student Dem. – Percent Asian-American	-5.6619	21.9546	0.797	-48.7050	37.3812
Student Dem. – Percent Hispanic	-6.5097	21.9590	0.767	-49.5612	36.5419
Student Dem. – Percent Native American	-8.0019	22.0027	0.716	-51.1393	35.1355
Student Dem. – Percent Pacific Islander	-4.5195	22.3216	0.840	-48.2821	39.2430
Student Dem. – Percent Two-race	-0.1288	22.0055	0.995	-43.2717	43.0141
Student Dem. – Percent White	-6.6580	21.9578	0.762	-49.7074	36.3913
Campus Type – Charter Campus	-76.7595	10.5640	0.000	-97.4706	-56.0484
Campus Type – Rural Campus	-44.3370	5.3892	0.000	-54.9029	-33.7712
Campus Type – Suburban Campus	-15.6508	4.0953	0.000	-23.6798	-7.6218
Teacher Dem. – Avg. Teacher Experience	1.0006	0.5990	0.095	-0.1738	2.1749
Student Dem. – Percent At-risk	-0.4775	0.1489	0.001	-0.7695	-0.1856
Student Dem. – Percent Bilingual	0.5411	0.4900	0.270	-0.4195	1.5017
Student Dem. – Percent Career & Technical Ed.	0.9094	0.3061	0.003	0.3094	1.5095
Student Dem. – Percent DAEP	-28.1444	3.3001	0.000	-34.6143	-21.6744
Student Dem. – Percent Econ. Disadvantaged	-0.8078	0.1232	0.000	-1.0493	-0.5663
Student Dem. – Percent GATE	-0.7139	0.2891	0.014	-1.2806	-0.1472
Student Dem. – Percent LEP	0.0208	0.5026	0.967	-0.9646	1.0063
Student Dem. – Percent Special Ed.	-3.3369	0.4915	0.000	-4.3004	-2.3734
Class Size - Grade 4 Avg. Class Size	1.7485	0.4464	0.000	0.8733	2.6237
Constant	1368.0750	2195.8870	0.533	-2937.0660	5673.2160

TABLE 9-5. OLS Regression Results – Grade 4, Writing

Grade	4
Test	Writing
Number of Observations	4,091
R-Squared	0.1945
Adjusted R-Squared	0.1892

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-18.4336	24.4661	0.451	-66.4005	29.5333
Exp. by Funct. – Instruction Related	-5.4197	24.6969	0.826	-53.8393	42.9998
Exp. by Funct. – Instructional Leadership	-32.6846	26.0542	0.210	-83.7651	18.3958
Exp. by Funct. – Other	-18.6872	24.5433	0.446	-66.8054	29.4310
Exp. by Funct. – School Leadership	-39.6367	24.7866	0.110	-88.2320	8.9586
Exp. by Funct. – Supportive Services	-35.1386	24.9367	0.159	-84.0282	13.7510
Exp. by Funct. – Total Operating Funds	18.7983	24.4735	0.442	-29.1831	66.7798
Student Dem. – Percent African-American	-42.4517	67.9243	0.532	-175.6206	90.7172
Student Dem. – Percent Asian-American	-41.0826	67.9074	0.545	-174.2184	92.0531
Student Dem. – Percent Hispanic	-42.8894	67.9210	0.528	-176.0517	90.2729
Student Dem. – Percent Native American	-45.8518	68.0576	0.501	-179.2821	87.5784
Student Dem. – Percent Pacific Islander	-37.2908	69.0443	0.589	-172.6555	98.0739
Student Dem. – Percent Two-race	-26.1173	68.0607	0.701	-159.5535	107.3190
Student Dem. – Percent White	-44.0047	67.9173	0.517	-177.1598	89.1504
Campus Type – Charter Campus	-230.4500	32.8214	0.000	-294.7978	-166.1022
Campus Type – Rural Campus	-130.7467	16.6702	0.000	-163.4295	-98.0639
Campus Type – Suburban Campus	-49.7292	12.6601	0.000	-74.5500	-24.9084
Teacher Dem. – Avg. Teacher Experience	2.5361	1.8543	0.171	-1.0994	6.1715
Student Dem. – Percent At-risk	-1.3257	0.4617	0.004	-2.2308	-0.4206
Student Dem. – Percent Bilingual	1.2858	1.5146	0.396	-1.6837	4.2553
Student Dem. – Percent Career & Technical Ed.	3.5491	0.9497	0.000	1.6872	5.4110
Student Dem. – Percent DAEP	-80.8266	10.2046	0.000	-100.8332	-60.8200
Student Dem. – Percent Econ. Disadvantaged	-1.4916	0.3816	0.000	-2.2397	-0.7434
Student Dem. – Percent GATE	-2.7448	0.8937	0.002	-4.4969	-0.9927
Student Dem. – Percent LEP	0.2488	1.5540	0.873	-2.7978	3.2954
Student Dem. – Percent Special Ed.	-15.0460	1.5430	0.000	-18.0712	-12.0207
Class Size - Grade 4 Avg. Class Size	4.4689	1.3879	0.001	1.7479	7.1898
Constant	6889.6960	6792.0450	0.310	-6426.4350	20205.8300

TABLE 9-6. OLS Regression Results – Grade 5, Math

Grade	5
Test	Math
Number of Observations	3,798
R-Squared	0.4203
Adjusted R-Squared	0.4162

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-7.2748	4.6304	0.116	-16.3531	1.8036
Exp. by Funct. – Instruction Related	-4.0044	4.6716	0.391	-13.1635	5.1548
Exp. by Funct. – Instructional Leadership	-2.4234	4.9441	0.624	-12.1168	7.2700
Exp. by Funct. – Other	-5.6065	4.6447	0.227	-14.7128	3.4998
Exp. by Funct. – School Leadership	-12.1570	4.6782	0.009	-21.3290	-2.9850
Exp. by Funct. – Supportive Services	-5.5706	4.7195	0.238	-14.8236	3.6825
Exp. by Funct. – Total Operating Funds	6.3856	4.6318	0.168	-2.6954	15.4666
Student Dem. – Percent African-American	11.4090	13.4054	0.395	-14.8736	37.6915
Student Dem. – Percent Asian-American	12.4097	13.4027	0.355	-13.8676	38.6870
Student Dem. – Percent Hispanic	11.5322	13.4044	0.390	-14.7483	37.8127
Student Dem. – Percent Native American	10.9551	13.4274	0.415	-15.3706	37.2808
Student Dem. – Percent Pacific Islander	15.2939	13.6197	0.262	-11.4088	41.9967
Student Dem. – Percent Two-race	12.4568	13.4282	0.354	-13.8703	38.7840
Student Dem. – Percent White	11.6018	13.4029	0.387	-14.6759	37.8795
Campus Type – Charter Campus	-43.1941	6.1644	0.000	-55.2799	-31.1083
Campus Type – Rural Campus	-0.0708	3.3800	0.983	-6.6975	6.5560
Campus Type – Suburban Campus	3.0594	2.4868	0.219	-1.8161	7.9350
Teacher Dem. – Avg. Teacher Experience	1.3972	0.3642	0.000	0.6832	2.1112
Student Dem. – Percent At-risk	-0.8455	0.0908	0.000	-1.0236	-0.6675
Student Dem. – Percent Bilingual	0.0776	0.2972	0.794	-0.5051	0.6604
Student Dem. – Percent Career & Technical Ed.	-0.3414	0.1705	0.045	-0.6757	-0.0072
Student Dem. – Percent DAEP	-5.7776	1.4641	0.000	-8.6480	-2.9072
Student Dem. – Percent Econ. Disadvantaged	-0.1377	0.0793	0.083	-0.2932	0.0178
Student Dem. – Percent GATE	0.8187	0.1685	0.000	0.4883	1.1490
Student Dem. – Percent LEP	0.3831	0.3052	0.209	-0.2153	0.9815
Student Dem. – Percent Special Ed.	-2.6873	0.2799	0.000	-3.2362	-2.1385
Class Size - Grade 5 Avg. Class Size	2.0509	0.2180	0.000	1.6236	2.4783
Constant	-406.9013	1340.3980	0.761	-3034.8770	2221.0740

TABLE 9-7. OLS Regression Results – Grade 5, Reading

Grade	5
Test	Reading
Number of Observations	3,798
R-Squared	0.4065
Adjusted R-Squared	0.4022

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-6.0625	4.5608	0.184	-15.0044	2.8794
Exp. by Funct. – Instruction Related	-2.4638	4.6014	0.592	-11.4853	6.5577
Exp. by Funct. – Instructional Leadership	-1.9671	4.8698	0.686	-11.5149	7.5806
Exp. by Funct. – Other	-4.3454	4.5749	0.342	-13.3149	4.6240
Exp. by Funct. – School Leadership	-10.5560	4.6079	0.022	-19.5902	-1.5219
Exp. by Funct. – Supportive Services	-3.5024	4.6486	0.451	-12.6164	5.6116
Exp. by Funct. – Total Operating Funds	5.0875	4.5622	0.265	-3.8571	14.0320
Student Dem. – Percent African-American	12.7102	13.2039	0.336	-13.1773	38.5978
Student Dem. – Percent Asian-American	13.3616	13.2013	0.312	-12.5207	39.2439
Student Dem. – Percent Hispanic	12.7317	13.2029	0.335	-13.1538	38.6172
Student Dem. – Percent Native American	13.5777	13.2256	0.305	-12.3523	39.5078
Student Dem. – Percent Pacific Islander	15.9639	13.4150	0.234	-10.3376	42.2653
Student Dem. – Percent Two-race	14.3795	13.2263	0.277	-11.5519	40.3110
Student Dem. – Percent White	12.8533	13.2015	0.330	-13.0294	38.7361
Campus Type – Charter Campus	-30.2964	6.0717	0.000	-42.2005	-18.3922
Campus Type – Rural Campus	2.6487	3.3292	0.426	-3.8785	9.1758
Campus Type – Suburban Campus	1.4996	2.4494	0.540	-3.3026	6.3019
Teacher Dem. – Avg. Teacher Experience	1.4168	0.3587	0.000	0.7135	2.1201
Student Dem. – Percent At-risk	-0.6700	0.0894	0.000	-0.8454	-0.4946
Student Dem. – Percent Bilingual	0.2010	0.2928	0.492	-0.3730	0.7749
Student Dem. – Percent Career & Technical Ed.	-0.3103	0.1679	0.065	-0.6395	0.0189
Student Dem. – Percent DAEP	-5.3172	1.4421	0.000	-8.1445	-2.4899
Student Dem. – Percent Econ. Disadvantaged	-0.1526	0.0781	0.051	-0.3058	0.0006
Student Dem. – Percent GATE	0.7609	0.1660	0.000	0.4356	1.0863
Student Dem. – Percent LEP	-0.0761	0.3006	0.800	-0.6656	0.5133
Student Dem. – Percent Special Ed.	-2.9546	0.2757	0.000	-3.4952	-2.4140
Class Size - Grade 5 Avg. Class Size	2.0701	0.2147	0.000	1.6492	2.4910
Constant	-520.1916	1320.2520	0.694	-3108.6700	2068.2870

TABLE 9-8. OLS Regression Results – Grade 5, Science

Grade	5
Test	Science
Number of Observations	3,798
R-Squared	0.3935
Adjusted R-Squared	0.3891

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-19.5627	15.2100	0.198	-49.3833	10.2578
Exp. by Funct. – Instruction Related	-12.4378	15.3454	0.418	-42.5238	17.6482
Exp. by Funct. – Instructional Leadership	-11.8731	16.2404	0.465	-43.7140	19.9678
Exp. by Funct. – Other	-14.5266	15.2569	0.341	-44.4391	15.3860
Exp. by Funct. – School Leadership	-34.6221	15.3669	0.024	-64.7503	-4.4940
Exp. by Funct. – Supportive Services	-8.5439	15.5027	0.582	-38.9383	21.8505
Exp. by Funct. – Total Operating Funds	16.7339	15.2145	0.271	-13.0955	46.5632
Student Dem. – Percent African-American	42.8405	44.0341	0.331	-43.4926	129.1735
Student Dem. – Percent Asian-American	44.6729	44.0253	0.310	-41.6428	130.9885
Student Dem. – Percent Hispanic	43.0558	44.0306	0.328	-43.2704	129.3820
Student Dem. – Percent Native American	31.8338	44.1064	0.470	-54.6409	118.3085
Student Dem. – Percent Pacific Islander	54.3424	44.7381	0.225	-33.3709	142.0557
Student Dem. – Percent Two-race	47.0418	44.1088	0.286	-39.4377	133.5212
Student Dem. – Percent White	43.7101	44.0260	0.321	-42.6069	130.0271
Campus Type – Charter Campus	-136.7326	20.2487	0.000	-176.4320	-97.0331
Campus Type – Rural Campus	3.2745	11.1025	0.768	-18.4930	25.0420
Campus Type – Suburban Campus	13.9635	8.1685	0.087	-2.0516	29.9787
Teacher Dem. – Avg. Teacher Experience	4.4291	1.1963	0.000	2.0837	6.7746
Student Dem. – Percent At-risk	-2.6987	0.2983	0.000	-3.2836	-2.1139
Student Dem. – Percent Bilingual	0.1842	0.9763	0.850	-1.7300	2.0984
Student Dem. – Percent Career & Technical Ed.	-1.4152	0.5600	0.012	-2.5131	-0.3173
Student Dem. – Percent DAEP	-15.6525	4.8091	0.001	-25.0813	-6.2237
Student Dem. – Percent Econ. Disadvantaged	0.4614	0.2606	0.077	-0.0494	0.9723
Student Dem. – Percent GATE	2.1899	0.5534	0.000	1.1049	3.2750
Student Dem. – Percent LEP	0.7178	1.0026	0.474	-1.2479	2.6835
Student Dem. – Percent Special Ed.	-10.6174	0.9196	0.000	-12.4203	-8.8145
Class Size - Grade 5 Avg. Class Size	7.1455	0.7160	0.000	5.7418	8.5492
Constant	-1885.8210	4402.9420	0.668	-10518.2000	6746.5590

TABLE 9-9. OLS Regression Results – Grade 6, Math

Grade	6
Test	Math
Number of Observations	2,208
R-Squared	0.3845
Adjusted R-Squared	0.3769

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-4.0412	3.0937	0.192	-10.1082	2.0258
Exp. by Funct. – Instruction Related	-0.5454	3.3376	0.870	-7.0906	5.9998
Exp. by Funct. – Instructional Leadership	-5.1216	3.7631	0.174	-12.5012	2.2580
Exp. by Funct. – Other	-2.8771	3.1027	0.354	-8.9616	3.2075
Exp. by Funct. – School Leadership	-8.0086	3.0726	0.009	-14.0341	-1.9831
Exp. by Funct. – Supportive Services	-1.5162	3.2031	0.636	-7.7977	4.7653
Exp. by Funct. – Total Operating Funds	2.9614	3.0781	0.336	-3.0749	8.9977
Student Dem. – Percent African-American	-12.9726	20.8770	0.534	-53.9135	27.9684
Student Dem. – Percent Asian-American	-12.5119	20.8760	0.549	-53.4507	28.4270
Student Dem. – Percent Hispanic	-13.2390	20.8788	0.526	-54.1833	27.7054
Student Dem. – Percent Native American	-13.5850	20.9099	0.516	-54.5904	27.4204
Student Dem. – Percent Pacific Islander	-4.8804	21.1170	0.817	-46.2920	36.5313
Student Dem. – Percent Two-race	-14.2082	20.8789	0.496	-55.1527	26.7364
Student Dem. – Percent White	-13.1153	20.8777	0.530	-54.0574	27.8269
Campus Type – Charter Campus	19.0029	8.5329	0.026	2.2694	35.7364
Campus Type – Rural Campus	8.5767	5.0496	0.090	-1.3258	18.4793
Campus Type – Suburban Campus	0.9337	4.2303	0.825	-7.3621	9.2294
Teacher Dem. – Avg. Teacher Experience	2.1247	0.5843	0.000	0.9788	3.2706
Student Dem. – Percent At-risk	-0.9106	0.1489	0.000	-1.2025	-0.6187
Student Dem. – Percent Bilingual	0.6332	0.6812	0.353	-0.7026	1.9691
Student Dem. – Percent Career & Technical Ed.	-0.0418	0.1037	0.687	-0.2452	0.1615
Student Dem. – Percent DAEP	-0.2356	0.8580	0.784	-1.9181	1.4470
Student Dem. – Percent Econ. Disadvantaged	-0.1970	0.1205	0.102	-0.4334	0.0393
Student Dem. – Percent GATE	0.9952	0.2478	0.000	0.5093	1.4811
Student Dem. – Percent LEP	0.3556	0.6959	0.609	-1.0091	1.7202
Student Dem. – Percent Special Ed.	-1.2829	0.3885	0.001	-2.0447	-0.5211
Class Size - Grade 6 Avg. Class Size	2.8918	0.3296	0.000	2.2455	3.5382
Constant	2061.7440	2088.0470	0.324	-2033.0270	6156.5150

TABLE 9-10. OLS Regression Results – Grade 6, Reading

Grade	6
Test	Reading
Number of Observations	2,208
R-Squared	0.4064
Adjusted R-Squared	0.3990

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-1.5498	2.9677	0.602	-7.3697	4.2700
Exp. by Funct. – Instruction Related	1.9892	3.2016	0.534	-4.2894	8.2678
Exp. by Funct. – Instructional Leadership	-4.2484	3.6098	0.239	-11.3274	2.8307
Exp. by Funct. – Other	-0.2593	2.9763	0.931	-6.0960	5.5775
Exp. by Funct. – School Leadership	-5.5826	2.9474	0.058	-11.3627	0.1975
Exp. by Funct. – Supportive Services	0.8572	3.0727	0.780	-5.1685	6.8828
Exp. by Funct. – Total Operating Funds	0.4143	2.9527	0.888	-5.3761	6.2047
Student Dem. – Percent African-American	-12.1064	20.0267	0.546	-51.3799	27.1670
Student Dem. – Percent Asian-American	-11.7676	20.0257	0.557	-51.0390	27.5039
Student Dem. – Percent Hispanic	-12.4088	20.0284	0.536	-51.6855	26.8679
Student Dem. – Percent Native American	-12.0719	20.0583	0.547	-51.4072	27.2634
Student Dem. – Percent Pacific Islander	-5.1956	20.2569	0.798	-44.9205	34.5294
Student Dem. – Percent Two-race	-12.5777	20.0285	0.530	-51.8546	26.6992
Student Dem. – Percent White	-12.2960	20.0273	0.539	-51.5706	26.9787
Campus Type – Charter Campus	19.8855	8.1854	0.015	3.8335	35.9374
Campus Type – Rural Campus	8.8716	4.8439	0.067	-0.6276	18.3708
Campus Type – Suburban Campus	-3.2335	4.0580	0.426	-11.1914	4.7244
Teacher Dem. – Avg. Teacher Experience	2.3657	0.5605	0.000	1.2665	3.4650
Student Dem. – Percent At-risk	-0.7122	0.1428	0.000	-0.9922	-0.4321
Student Dem. – Percent Bilingual	0.7368	0.6534	0.260	-0.5446	2.0183
Student Dem. – Percent Career & Technical Ed.	0.0177	0.0995	0.859	-0.1773	0.2128
Student Dem. – Percent DAEP	-0.7351	0.8230	0.372	-2.3491	0.8789
Student Dem. – Percent Econ. Disadvantaged	-0.2534	0.1156	0.029	-0.4801	-0.0267
Student Dem. – Percent GATE	1.0161	0.2377	0.000	0.5500	1.4822
Student Dem. – Percent LEP	-0.3420	0.6675	0.608	-1.6510	0.9670
Student Dem. – Percent Special Ed.	-1.6453	0.3726	0.000	-2.3760	-0.9145
Class Size - Grade 6 Avg. Class Size	2.6595	0.3162	0.000	2.0395	3.2795
Constant	2001.9170	2003.0020	0.318	-1926.0750	5929.9090

TABLE 9-11. OLS Regression Results – Grade 7, Math

Grade	7
Test	Math
Number of Observations	1,950
R-Squared	0.3554
Adjusted R-Squared	0.3467

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-2.8797	1.2736	0.024	-5.3776	-0.3818
Exp. by Funct. – Instruction Related	0.0691	1.9666	0.972	-3.7877	3.9259
Exp. by Funct. – Instructional Leadership	2.0540	3.0983	0.507	-4.0224	8.1305
Exp. by Funct. – Other	-2.4950	1.2722	0.050	-4.9899	0.0000
Exp. by Funct. – School Leadership	-3.8189	1.5427	0.013	-6.8446	-0.7933
Exp. by Funct. – Supportive Services	-4.4520	1.5871	0.005	-7.5646	-1.3395
Exp. by Funct. – Total Operating Funds	2.2484	1.2470	0.072	-0.1972	4.6940
Student Dem. – Percent African-American	9.4197	34.2912	0.784	-57.8322	76.6715
Student Dem. – Percent Asian-American	10.6668	34.2839	0.756	-56.5708	77.9044
Student Dem. – Percent Hispanic	9.6168	34.2937	0.779	-57.6400	76.8737
Student Dem. – Percent Native American	8.6709	34.4245	0.801	-58.8423	76.1841
Student Dem. – Percent Pacific Islander	14.2998	34.6096	0.680	-53.5765	82.1760
Student Dem. – Percent Two-race	10.8813	34.3333	0.751	-56.4532	78.2158
Student Dem. – Percent White	9.8988	34.2929	0.773	-57.3564	77.1540
Campus Type – Charter Campus	-5.0948	12.8518	0.692	-30.2996	20.1101
Campus Type – Rural Campus	-0.6462	8.4165	0.939	-17.1526	15.8602
Campus Type – Suburban Campus	13.8524	7.5918	0.068	-1.0366	28.7413
Teacher Dem. – Avg. Teacher Experience	-0.8603	0.9256	0.353	-2.6756	0.9550
Student Dem. – Percent At-risk	-2.2025	0.1940	0.000	-2.5830	-1.8219
Student Dem. – Percent Bilingual	-0.7705	1.1778	0.513	-3.0804	1.5394
Student Dem. – Percent Career & Technical Ed.	0.0895	0.1248	0.474	-0.1553	0.3342
Student Dem. – Percent DAEP	3.0431	1.1514	0.008	0.7850	5.3013
Student Dem. – Percent Econ. Disadvantaged	0.7378	0.1722	0.000	0.4001	1.0755
Student Dem. – Percent GATE	1.5167	0.3654	0.000	0.8001	2.2333
Student Dem. – Percent LEP	1.3002	1.2132	0.284	-1.0792	3.6796
Student Dem. – Percent Special Ed.	-2.5324	0.3952	0.000	-3.3074	-1.7574
Constant	-156.6506	3430.5670	0.964	-6884.6730	6571.3720

TABLE 9-12. OLS Regression Results – Grade 7, Reading

Grade	7
Test	Reading
Number of Observations	1,950
R-Squared	0.3657
Adjusted R-Squared	0.3571

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-3.0393	1.2878	0.018	-5.5649	-0.5136
Exp. by Funct. – Instruction Related	-1.0114	1.9891	0.611	-4.9125	2.8897
Exp. by Funct. – Instructional Leadership	2.7159	3.1578	0.390	-3.4771	8.9090
Exp. by Funct. – Other	-2.3910	1.2865	0.063	-4.9142	0.1321
Exp. by Funct. – School Leadership	-4.3146	1.5603	0.006	-7.3745	-1.2546
Exp. by Funct. – Supportive Services	-3.8359	1.6056	0.017	-6.9849	-0.6869
Exp. by Funct. – Total Operating Funds	2.4014	1.2611	0.057	-0.0719	4.8748
Student Dem. – Percent African-American	-5.3597	34.6684	0.877	-73.3513	62.6318
Student Dem. – Percent Asian-American	-4.1110	34.6609	0.906	-72.0880	63.8659
Student Dem. – Percent Hispanic	-5.1567	34.6708	0.882	-73.1530	62.8396
Student Dem. – Percent Native American	-6.1172	34.8013	0.860	-74.3693	62.1350
Student Dem. – Percent Pacific Islander	-0.2882	34.9901	0.993	-68.9108	68.3343
Student Dem. – Percent Two-race	-3.8239	34.7087	0.912	-71.8946	64.2468
Student Dem. – Percent White	-4.7052	34.6700	0.892	-72.7000	63.2897
Campus Type – Charter Campus	5.1660	13.0268	0.692	-20.3822	30.7143
Campus Type – Rural Campus	1.4232	8.5093	0.867	-15.2653	18.1117
Campus Type – Suburban Campus	10.0137	7.6757	0.192	-5.0400	25.0673
Teacher Dem. – Avg. Teacher Experience	-0.3141	0.9328	0.736	-2.1436	1.5154
Student Dem. – Percent At-risk	-2.1975	0.1956	0.000	-2.5811	-1.8140
Student Dem. – Percent Bilingual	-0.9061	1.1878	0.446	-3.2357	1.4235
Student Dem. – Percent Career & Technical Ed.	0.0655	0.1262	0.604	-0.1821	0.3130
Student Dem. – Percent DAEP	5.0641	1.1641	0.000	2.7810	7.3471
Student Dem. – Percent Econ. Disadvantaged	0.6897	0.1740	0.000	0.3484	1.0311
Student Dem. – Percent GATE	1.5287	0.3696	0.000	0.8039	2.2536
Student Dem. – Percent LEP	1.0309	1.2242	0.400	-1.3699	3.4317
Student Dem. – Percent Special Ed.	-2.8314	0.4003	0.000	-3.6165	-2.0463
Constant	1335.2270	3468.3090	0.700	-5466.8150	8137.2680

TABLE 9-13. OLS Regression Results – Grade 7, Writing

Grade	7
Test	Writing
Number of Observations	1,951
R-Squared	0.3480
Adjusted R-Squared	0.3392

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-10.8115	4.1634	0.009	-18.9767	-2.6464
Exp. by Funct. – Instruction Related	-1.2704	6.4044	0.843	-13.8306	11.2899
Exp. by Funct. – Instructional Leadership	-9.3539	10.0180	0.351	-29.0013	10.2935
Exp. by Funct. – Other	-8.8955	4.1738	0.033	-17.0812	-0.7098
Exp. by Funct. – School Leadership	-16.1218	5.1003	0.002	-26.1244	-6.1191
Exp. by Funct. – Supportive Services	-12.4069	5.1641	0.016	-22.5347	-2.2790
Exp. by Funct. – Total Operating Funds	9.0026	4.0922	0.028	0.9770	17.0281
Student Dem. – Percent African-American	-5.5962	110.0599	0.959	-221.4454	210.2529
Student Dem. – Percent Asian-American	-4.8316	110.0372	0.965	-220.6364	210.9732
Student Dem. – Percent Hispanic	-5.6565	110.0675	0.959	-221.5207	210.2076
Student Dem. – Percent Native American	-9.2401	110.4778	0.933	-225.9090	207.4288
Student Dem. – Percent Pacific Islander	6.8919	111.0771	0.951	-210.9524	224.7361
Student Dem. – Percent Two-race	0.8324	110.1852	0.994	-215.2625	216.9274
Student Dem. – Percent White	-4.9154	110.0660	0.964	-220.7766	210.9458
Campus Type – Charter Campus	-39.7485	41.3965	0.337	-120.9352	41.4382
Campus Type – Rural Campus	14.6432	27.0407	0.588	-38.3890	67.6754
Campus Type – Suburban Campus	29.0363	24.3976	0.234	-18.8123	76.8848
Teacher Dem. – Avg. Teacher Experience	-3.7062	2.9647	0.211	-9.5205	2.1081
Student Dem. – Percent At-risk	-5.8091	0.6245	0.000	-7.0339	-4.5843
Student Dem. – Percent Bilingual	-3.6902	3.7721	0.328	-11.0881	3.7077
Student Dem. – Percent Career & Technical Ed.	0.3488	0.4010	0.384	-0.4376	1.1352
Student Dem. – Percent DAEP	10.0198	3.6958	0.007	2.7717	17.2679
Student Dem. – Percent Econ. Disadvantaged	2.1678	0.5550	0.000	1.0794	3.2563
Student Dem. – Percent GATE	3.8343	1.1740	0.001	1.5319	6.1366
Student Dem. – Percent LEP	4.3133	3.8879	0.267	-3.3117	11.9383
Student Dem. – Percent Special Ed.	-10.9731	1.2727	0.000	-13.4691	-8.4770
Constant	3162.2000	11010.7300	0.774	-18432.0200	24756.4200

TABLE 9-14. OLS Regression Results – Grade 8, History

Grade	8
Test	History
Number of Observations	1,911
R-Squared	0.5526
Adjusted R-Squared	0.5465

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	4.2939	2.1800	0.049	0.0185	8.5693
Exp. by Funct. – Instruction Related	5.1195	2.3878	0.032	0.4364	9.8025
Exp. by Funct. – Instructional Leadership	2.2229	2.6940	0.409	-3.0606	7.5064
Exp. by Funct. – Other	4.7673	2.1808	0.029	0.4902	9.0443
Exp. by Funct. – School Leadership	4.5247	2.2496	0.044	0.1128	8.9366
Exp. by Funct. – Supportive Services	3.9878	2.1772	0.067	-0.2823	8.2578
Exp. by Funct. – Total Operating Funds	-4.4196	2.1680	0.042	-8.6715	-0.1676
Student Dem. – Percent African-American	5.5059	18.7083	0.769	-31.1853	42.1970
Student Dem. – Percent Asian-American	8.1084	18.7041	0.665	-28.5746	44.7913
Student Dem. – Percent Hispanic	5.6712	18.7094	0.762	-31.0223	42.3646
Student Dem. – Percent Native American	3.3156	18.7956	0.860	-33.5467	40.1779
Student Dem. – Percent Pacific Islander	12.5151	18.8881	0.508	-24.5286	49.5589
Student Dem. – Percent Two-race	5.7167	18.7222	0.760	-31.0017	42.4352
Student Dem. – Percent White	5.6387	18.7094	0.763	-31.0547	42.3321
Campus Type – Charter Campus	-4.0434	7.1412	0.571	-18.0488	9.9620
Campus Type – Rural Campus	-13.2671	4.5594	0.004	-22.2091	-4.3252
Campus Type – Suburban Campus	7.0637	4.0884	0.084	-0.9545	15.0819
Teacher Dem. – Avg. Teacher Experience	-0.7306	0.5039	0.147	-1.7189	0.2577
Student Dem. – Percent At-risk	-2.2735	0.1100	0.000	-2.4892	-2.0577
Student Dem. – Percent Bilingual	0.8068	0.6405	0.208	-0.4494	2.0629
Student Dem. – Percent Career & Technical Ed.	-0.3237	0.0662	0.000	-0.4536	-0.1938
Student Dem. – Percent DAEP	-0.4317	0.6289	0.493	-1.6652	0.8018
Student Dem. – Percent Econ. Disadvantaged	-0.4420	0.0986	0.000	-0.6354	-0.2486
Student Dem. – Percent GATE	1.0198	0.1984	0.000	0.6306	1.4089
Student Dem. – Percent LEP	-0.0163	0.6602	0.980	-1.3110	1.2784
Student Dem. – Percent Special Ed.	-0.8079	0.2560	0.002	-1.3101	-0.3058
Constant	1905.4100	1871.5620	0.309	-1765.1430	5575.9620

TABLE 9-15. OLS Regression Results – Grade 8, Math

Grade	8
Test	Math
Number of Observations	1,905
R-Squared	0.6178
Adjusted R-Squared	0.6126

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.7659	1.1103	0.490	-1.4116	2.9434
Exp. by Funct. – Instruction Related	0.7976	1.1946	0.504	-1.5453	3.1405
Exp. by Funct. – Instructional Leadership	-0.2313	1.3001	0.859	-2.7811	2.3186
Exp. by Funct. – Other	0.7183	1.1088	0.517	-1.4563	2.8930
Exp. by Funct. – School Leadership	0.1154	1.1309	0.919	-2.1026	2.3334
Exp. by Funct. – Supportive Services	0.0201	1.0958	0.985	-2.1290	2.1692
Exp. by Funct. – Total Operating Funds	-0.6690	1.1033	0.544	-2.8329	1.4950
Student Dem. – Percent African-American	10.4390	7.8663	0.185	-4.9886	25.8666
Student Dem. – Percent Asian-American	11.7359	7.8649	0.136	-3.6889	27.1606
Student Dem. – Percent Hispanic	10.6172	7.8669	0.177	-4.8116	26.0460
Student Dem. – Percent Native American	9.3897	7.9007	0.235	-6.1054	24.8848
Student Dem. – Percent Pacific Islander	14.0191	7.9433	0.078	-1.5595	29.5978
Student Dem. – Percent Two-race	9.7666	7.8720	0.215	-5.6722	25.2055
Student Dem. – Percent White	10.6510	7.8669	0.176	-4.7777	26.0797
Campus Type – Charter Campus	1.2838	2.9853	0.667	-4.5710	7.1386
Campus Type – Rural Campus	-2.3877	1.9189	0.214	-6.1511	1.3757
Campus Type – Suburban Campus	4.6189	1.7188	0.007	1.2480	7.9898
Teacher Dem. – Avg. Teacher Experience	0.2255	0.2144	0.293	-0.1951	0.6460
Student Dem. – Percent At-risk	-1.0768	0.0467	0.000	-1.1684	-0.9853
Student Dem. – Percent Bilingual	0.5787	0.2697	0.032	0.0498	1.1077
Student Dem. – Percent Career & Technical Ed.	-0.1542	0.0279	0.000	-0.2088	-0.0995
Student Dem. – Percent DAEP	-0.7268	0.2689	0.007	-1.2541	-0.1995
Student Dem. – Percent Econ. Disadvantaged	-0.1797	0.0421	0.000	-0.2623	-0.0971
Student Dem. – Percent GATE	0.5025	0.0833	0.000	0.3391	0.6659
Student Dem. – Percent LEP	-0.0449	0.2779	0.872	-0.5900	0.5002
Student Dem. – Percent Special Ed.	-0.4104	0.1062	0.000	-0.6187	-0.2021
Constant	-241.4066	786.9624	0.759	-1784.8190	1302.0060

TABLE 9-16. OLS Regression Results – Grade 8, Reading

Grade	8
Test	Reading
Number of Observations	1,907
R-Squared	0.7131
Adjusted R-Squared	0.7091

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	4.8538	0.8269	0.000	3.2321	6.4755
Exp. by Funct. – Instruction Related	5.1259	0.8964	0.000	3.3678	6.8839
Exp. by Funct. – Instructional Leadership	3.8456	0.9922	0.000	1.8996	5.7915
Exp. by Funct. – Other	4.9701	0.8273	0.000	3.3477	6.5926
Exp. by Funct. – School Leadership	4.5508	0.8498	0.000	2.8841	6.2174
Exp. by Funct. – Supportive Services	3.8039	0.8271	0.000	2.1817	5.4261
Exp. by Funct. – Total Operating Funds	-4.7738	0.8224	0.000	-6.3867	-3.1609
Student Dem. – Percent African-American	0.8973	6.5827	0.892	-12.0129	13.8076
Student Dem. – Percent Asian-American	1.9607	6.5815	0.766	-10.9472	14.8686
Student Dem. – Percent Hispanic	1.0771	6.5833	0.870	-11.8342	13.9883
Student Dem. – Percent Native American	0.0812	6.6118	0.990	-12.8859	13.0484
Student Dem. – Percent Pacific Islander	4.5001	6.6472	0.498	-8.5366	17.5368
Student Dem. – Percent Two-race	1.4837	6.5875	0.822	-11.4358	14.4032
Student Dem. – Percent White	1.1324	6.5832	0.863	-11.7789	14.0436
Campus Type – Charter Campus	7.9079	2.4949	0.002	3.0148	12.8009
Campus Type – Rural Campus	-2.4952	1.6058	0.120	-5.6444	0.6541
Campus Type – Suburban Campus	0.8833	1.4384	0.539	-1.9378	3.7044
Teacher Dem. – Avg. Teacher Experience	-0.2542	0.1789	0.155	-0.6050	0.0966
Student Dem. – Percent At-risk	-0.9557	0.0389	0.000	-1.0320	-0.8795
Student Dem. – Percent Bilingual	0.5188	0.2257	0.022	0.0761	0.9614
Student Dem. – Percent Career & Technical Ed.	-0.0610	0.0233	0.009	-0.1067	-0.0153
Student Dem. – Percent DAEP	-0.4201	0.2249	0.062	-0.8611	0.0209
Student Dem. – Percent Econ. Disadvantaged	-0.2617	0.0352	0.000	-0.3307	-0.1926
Student Dem. – Percent GATE	0.5182	0.0697	0.000	0.3814	0.6550
Student Dem. – Percent LEP	-0.5737	0.2326	0.014	-1.0298	-0.1176
Student Dem. – Percent Special Ed.	-0.6164	0.0884	0.000	-0.7898	-0.4431
Constant	764.0489	658.5514	0.246	-527.5198	2055.6180

TABLE 9-17. OLS Regression Results – Grade 8, Science

Grade	8
Test	Science
Number of Observations	1,912
R-Squared	0.6248
Adjusted R-Squared	0.6196

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	10.8242	2.5115	0.000	5.8986	15.7499
Exp. by Funct. – Instruction Related	11.2771	2.7498	0.000	5.8842	16.6700
Exp. by Funct. – Instructional Leadership	6.1434	3.1072	0.048	0.0494	12.2373
Exp. by Funct. – Other	11.1452	2.5127	0.000	6.2173	16.0730
Exp. by Funct. – School Leadership	10.5918	2.5925	0.000	5.5074	15.6761
Exp. by Funct. – Supportive Services	9.6200	2.5123	0.000	4.6928	14.5472
Exp. by Funct. – Total Operating Funds	-10.7626	2.4977	0.000	-15.6612	-5.8640
Student Dem. – Percent African-American	7.0762	21.5542	0.743	-35.1964	49.3487
Student Dem. – Percent Asian-American	9.7157	21.5493	0.652	-32.5473	51.9787
Student Dem. – Percent Hispanic	7.7195	21.5555	0.720	-34.5556	49.9946
Student Dem. – Percent Native American	3.8246	21.6547	0.860	-38.6451	46.2943
Student Dem. – Percent Pacific Islander	13.5247	21.7614	0.534	-29.1542	56.2036
Student Dem. – Percent Two-race	7.5777	21.5702	0.725	-34.7263	49.8817
Student Dem. – Percent White	7.9514	21.5555	0.712	-34.3237	50.2264
Campus Type – Charter Campus	6.4170	8.2378	0.436	-9.7391	22.5731
Campus Type – Rural Campus	-9.7671	5.2537	0.063	-20.0709	0.5366
Campus Type – Suburban Campus	10.8682	4.7086	0.021	1.6336	20.1028
Teacher Dem. – Avg. Teacher Experience	-0.7675	0.5796	0.186	-1.9041	0.3692
Student Dem. – Percent At-risk	-3.0200	0.1264	0.000	-3.2678	-2.7722
Student Dem. – Percent Bilingual	1.6875	0.7379	0.022	0.2404	3.1347
Student Dem. – Percent Career & Technical Ed.	-0.4618	0.0763	0.000	-0.6115	-0.3121
Student Dem. – Percent DAEP	-0.5790	0.7248	0.424	-2.0005	0.8425
Student Dem. – Percent Econ. Disadvantaged	-0.5430	0.1136	0.000	-0.7657	-0.3202
Student Dem. – Percent GATE	1.5295	0.2286	0.000	1.0812	1.9778
Student Dem. – Percent LEP	-0.6921	0.7604	0.363	-2.1834	0.7993
Student Dem. – Percent Special Ed.	-0.7800	0.2946	0.008	-1.3578	-0.2023
Constant	1643.7470	2156.2600	0.446	-2585.1600	5872.6550

TABLE 9-18. OLS Regression Results – Grade 9, Math

Grade	9
Test	Math
Number of Observations	1,665
R-Squared	0.6896
Adjusted R-Squared	0.6846

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	1.0213	1.6355	0.532	-2.1867	4.2293
Exp. by Funct. – Instruction Related	3.0520	2.0083	0.129	-0.8870	6.9910
Exp. by Funct. – Instructional Leadership	-2.4530	2.3379	0.294	-7.0386	2.1325
Exp. by Funct. – Other	1.1623	1.6505	0.481	-2.0750	4.3996
Exp. by Funct. – School Leadership	0.5239	1.6878	0.756	-2.7866	3.8344
Exp. by Funct. – Supportive Services	0.1951	1.7682	0.912	-3.2730	3.6633
Exp. by Funct. – Total Operating Funds	-0.9218	1.6324	0.572	-4.1236	2.2799
Student Dem. – Percent African-American	-43.7001	24.5667	0.075	-91.8856	4.4855
Student Dem. – Percent Asian-American	-39.0940	24.5938	0.112	-87.3326	9.1447
Student Dem. – Percent Hispanic	-43.2556	24.5720	0.079	-91.4514	4.9403
Student Dem. – Percent Native American	-44.5638	24.6342	0.071	-92.8816	3.7540
Student Dem. – Percent Pacific Islander	-40.1898	24.5578	0.102	-88.3578	7.9782
Student Dem. – Percent Two-race	-41.9768	24.6640	0.089	-90.3531	6.3995
Student Dem. – Percent White	-42.9594	24.5690	0.081	-91.1494	5.2306
Campus Type – Charter Campus	2.6822	8.8185	0.761	-14.6145	19.9789
Campus Type – Rural Campus	-19.3763	6.0745	0.001	-31.2910	-7.4617
Campus Type – Suburban Campus	0.5807	5.8061	0.920	-10.8074	11.9689
Teacher Dem. – Avg. Teacher Experience	-1.4082	0.6072	0.021	-2.5992	-0.2172
Student Dem. – Percent At-risk	-3.2116	0.1172	0.000	-3.4415	-2.9816
Student Dem. – Percent Bilingual	-0.4519	2.1177	0.831	-4.6055	3.7018
Student Dem. – Percent Career & Technical Ed.	0.1108	0.0760	0.145	-0.0383	0.2599
Student Dem. – Percent DAEP	-1.0507	0.7566	0.165	-2.5348	0.4334
Student Dem. – Percent Econ. Disadvantaged	-0.1715	0.1147	0.135	-0.3965	0.0535
Student Dem. – Percent GATE	2.6651	0.2717	0.000	2.1322	3.1980
Student Dem. – Percent LEP	1.3745	2.0837	0.510	-2.7124	5.4615
Student Dem. – Percent Special Ed.	-1.2610	0.2769	0.000	-1.8040	-0.7179
Constant	6675.6210	2457.3320	0.007	1855.7780	11495.4600

TABLE 9-19. OLS Regression Results – Grade 9, Reading

Grade	9
Test	Reading
Number of Observations	1,671
R-Squared	0.6543
Adjusted R-Squared	0.6488

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	3.2390	1.6385	0.048	0.0252	6.4528
Exp. by Funct. – Instruction Related	4.8774	1.7853	0.006	1.3757	8.3792
Exp. by Funct. – Instructional Leadership	2.3213	2.0603	0.260	-1.7197	6.3623
Exp. by Funct. – Other	3.4135	1.6511	0.039	0.1751	6.6519
Exp. by Funct. – School Leadership	3.1481	1.6892	0.063	-0.1650	6.4613
Exp. by Funct. – Supportive Services	2.5129	1.6455	0.127	-0.7146	5.7404
Exp. by Funct. – Total Operating Funds	-3.2216	1.6295	0.048	-6.4177	-0.0256
Student Dem. – Percent African-American	-31.3097	19.0387	0.100	-68.6523	6.0330
Student Dem. – Percent Asian-American	-29.1688	19.0591	0.126	-66.5514	8.2139
Student Dem. – Percent Hispanic	-30.8752	19.0425	0.105	-68.2254	6.4750
Student Dem. – Percent Native American	-30.2048	19.0878	0.114	-67.6437	7.2341
Student Dem. – Percent Pacific Islander	-28.6653	19.0309	0.132	-65.9926	8.6619
Student Dem. – Percent Two-race	-28.4651	19.1134	0.137	-65.9543	9.0242
Student Dem. – Percent White	-30.3771	19.0406	0.111	-67.7235	6.9693
Campus Type – Charter Campus	1.2959	6.8470	0.850	-12.1338	14.7256
Campus Type – Rural Campus	-9.4375	4.7254	0.046	-18.7061	-0.1690
Campus Type – Suburban Campus	-3.7216	4.4973	0.408	-12.5425	5.0994
Teacher Dem. – Avg. Teacher Experience	-0.6433	0.4721	0.173	-1.5692	0.2826
Student Dem. – Percent At-risk	-1.9615	0.0902	0.000	-2.1385	-1.7845
Student Dem. – Percent Bilingual	-0.2066	1.6442	0.900	-3.4315	3.0183
Student Dem. – Percent Career & Technical Ed.	-0.0597	0.0592	0.313	-0.1758	0.0563
Student Dem. – Percent DAEP	-0.4268	0.6158	0.488	-1.6346	0.7810
Student Dem. – Percent Econ. Disadvantaged	-0.2052	0.0898	0.022	-0.3812	-0.0292
Student Dem. – Percent GATE	1.6350	0.2110	0.000	1.2211	2.0489
Student Dem. – Percent LEP	0.2243	1.6182	0.890	-2.9496	3.3982
Student Dem. – Percent Special Ed.	-1.6844	0.2119	0.000	-2.1000	-1.2687
Constant	5464.1740	1904.3830	0.004	1728.9020	9199.4470

TABLE 9-20. OLS Regression Results – Grade 10, History

Grade	10
Test	History
Number of Observations	1,629
R-Squared	0.6333
Adjusted R-Squared	0.6273

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	2.8938	1.2867	0.025	0.3700	5.4177
Exp. by Funct. – Instruction Related	3.9006	1.5758	0.013	0.8099	6.9914
Exp. by Funct. – Instructional Leadership	5.5370	1.8647	0.003	1.8795	9.1946
Exp. by Funct. – Other	2.5090	1.2926	0.052	-0.0264	5.0444
Exp. by Funct. – School Leadership	2.4602	1.3190	0.062	-0.1270	5.0474
Exp. by Funct. – Supportive Services	1.2681	1.3851	0.360	-1.4487	3.9848
Exp. by Funct. – Total Operating Funds	-2.7631	1.2809	0.031	-5.2755	-0.2508
Student Dem. – Percent African-American	-17.8118	18.9262	0.347	-54.9345	19.3109
Student Dem. – Percent Asian-American	-15.1741	18.9467	0.423	-52.3370	21.9888
Student Dem. – Percent Hispanic	-17.4860	18.9304	0.356	-54.6171	19.6450
Student Dem. – Percent Native American	-18.6997	18.9863	0.325	-55.9404	18.5409
Student Dem. – Percent Pacific Islander	-18.0192	18.9890	0.343	-55.2651	19.2267
Student Dem. – Percent Two-race	-16.3053	19.0007	0.391	-53.5741	20.9635
Student Dem. – Percent White	-17.5105	18.9279	0.355	-54.6366	19.6156
Campus Type – Charter Campus	-19.9205	6.8987	0.004	-33.4519	-6.3890
Campus Type – Rural Campus	-35.9733	4.7643	0.000	-45.3182	-26.6284
Campus Type – Suburban Campus	-8.2342	4.5392	0.070	-17.1377	0.6692
Teacher Dem. – Avg. Teacher Experience	-0.9691	0.4606	0.036	-1.8726	-0.0656
Student Dem. – Percent At-risk	-2.1890	0.0944	0.000	-2.3741	-2.0039
Student Dem. – Percent Bilingual	0.2719	1.7096	0.874	-3.0815	3.6252
Student Dem. – Percent Career & Technical Ed.	-0.0095	0.0612	0.877	-0.1296	0.1106
Student Dem. – Percent DAEP	0.0322	0.6213	0.959	-1.1865	1.2509
Student Dem. – Percent Econ. Disadvantaged	-0.3122	0.0925	0.001	-0.4937	-0.1307
Student Dem. – Percent GATE	1.4938	0.2108	0.000	1.0803	1.9074
Student Dem. – Percent LEP	-0.1765	1.6805	0.916	-3.4726	3.1196
Student Dem. – Percent Special Ed.	-0.8413	0.2564	0.001	-1.3444	-0.3383
Constant	4226.4480	1893.2520	0.026	512.9373	7939.9590

TABLE 9-21. OLS Regression Results – Grade 10, Math

Grade	10
Test	Math
Number of Observations	1,633
R-Squared	0.6579
Adjusted R-Squared	0.6524

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	2.1209	1.2025	0.078	-0.2377	4.4795
Exp. by Funct. – Instruction Related	2.1134	1.4712	0.151	-0.7722	4.9991
Exp. by Funct. – Instructional Leadership	2.1451	1.7400	0.218	-1.2678	5.5580
Exp. by Funct. – Other	1.9565	1.2083	0.106	-0.4134	4.3265
Exp. by Funct. – School Leadership	1.0982	1.2339	0.374	-1.3221	3.5184
Exp. by Funct. – Supportive Services	1.2659	1.2937	0.328	-1.2716	3.8035
Exp. by Funct. – Total Operating Funds	-1.9039	1.1972	0.112	-4.2522	0.4443
Student Dem. – Percent African-American	3.3598	17.6625	0.849	-31.2840	38.0037
Student Dem. – Percent Asian-American	6.1795	17.6810	0.727	-28.5007	40.8597
Student Dem. – Percent Hispanic	3.7603	17.6664	0.831	-30.8912	38.4119
Student Dem. – Percent Native American	2.7272	17.7166	0.878	-32.0229	37.4772
Student Dem. – Percent Pacific Islander	2.1459	17.7119	0.904	-32.5949	36.8867
Student Dem. – Percent Two-race	3.0126	17.7296	0.865	-31.7631	37.7882
Student Dem. – Percent White	3.7757	17.6639	0.831	-30.8710	38.4224
Campus Type – Charter Campus	-2.7561	6.4400	0.669	-15.3877	9.8755
Campus Type – Rural Campus	-21.0244	4.4354	0.000	-29.7242	-12.3245
Campus Type – Suburban Campus	-5.9364	4.2396	0.162	-14.2522	2.3794
Teacher Dem. – Avg. Teacher Experience	-0.3551	0.4284	0.407	-1.1953	0.4852
Student Dem. – Percent At-risk	-2.1563	0.0867	0.000	-2.3264	-1.9862
Student Dem. – Percent Bilingual	-0.1918	1.5916	0.904	-3.3135	2.9300
Student Dem. – Percent Career & Technical Ed.	0.1088	0.0571	0.057	-0.0032	0.2207
Student Dem. – Percent DAEP	-0.6843	0.5794	0.238	-1.8208	0.4521
Student Dem. – Percent Econ. Disadvantaged	-0.1846	0.0858	0.032	-0.3529	-0.0164
Student Dem. – Percent GATE	1.9704	0.1969	0.000	1.5842	2.3566
Student Dem. – Percent LEP	0.5712	1.5652	0.715	-2.4990	3.6413
Student Dem. – Percent Special Ed.	-0.6367	0.2331	0.006	-1.0939	-0.1796
Constant	1915.8940	1766.7950	0.278	-1549.5720	5381.3600

TABLE 9-22. OLS Regression Results – Grade 10, Reading

Grade	10
Test	Reading
Number of Observations	1,651
R-Squared	0.6536
Adjusted R-Squared	0.6480

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	1.8920	0.8541	0.027	0.2168	3.5673
Exp. by Funct. – Instruction Related	1.9127	1.0455	0.068	-0.1381	3.9634
Exp. by Funct. – Instructional Leadership	3.3426	1.2204	0.006	0.9488	5.7364
Exp. by Funct. – Other	1.7640	0.8583	0.040	0.0804	3.4475
Exp. by Funct. – School Leadership	1.2254	0.8756	0.162	-0.4921	2.9429
Exp. by Funct. – Supportive Services	0.8412	0.9133	0.357	-0.9502	2.6325
Exp. by Funct. – Total Operating Funds	-1.6933	0.8506	0.047	-3.3616	-0.0249
Student Dem. – Percent African-American	-12.0061	12.5350	0.338	-36.5925	12.5803
Student Dem. – Percent Asian-American	-10.3164	12.5485	0.411	-34.9295	14.2966
Student Dem. – Percent Hispanic	-11.6855	12.5378	0.351	-36.2774	12.9063
Student Dem. – Percent Native American	-12.2766	12.5732	0.329	-36.9380	12.3847
Student Dem. – Percent Pacific Islander	-13.7263	12.5819	0.275	-38.4048	10.9523
Student Dem. – Percent Two-race	-11.3103	12.5838	0.369	-35.9924	13.3718
Student Dem. – Percent White	-11.5638	12.5362	0.356	-36.1525	13.0249
Campus Type – Charter Campus	-2.9913	4.5367	0.510	-11.8898	5.9071
Campus Type – Rural Campus	-13.5372	3.1246	0.000	-19.6659	-7.4085
Campus Type – Suburban Campus	-4.6282	2.9903	0.122	-10.4934	1.2370
Teacher Dem. – Avg. Teacher Experience	0.0506	0.3005	0.866	-0.5387	0.6400
Student Dem. – Percent At-risk	-1.3576	0.0612	0.000	-1.4775	-1.2376
Student Dem. – Percent Bilingual	1.3073	1.1314	0.248	-0.9118	3.5265
Student Dem. – Percent Career & Technical Ed.	0.0369	0.0401	0.359	-0.0419	0.1156
Student Dem. – Percent DAEP	-0.2147	0.4092	0.600	-1.0172	0.5878
Student Dem. – Percent Econ. Disadvantaged	-0.2069	0.0600	0.001	-0.3245	-0.0893
Student Dem. – Percent GATE	1.0606	0.1399	0.000	0.7862	1.3351
Student Dem. – Percent LEP	-1.3750	1.1130	0.217	-3.5580	0.8080
Student Dem. – Percent Special Ed.	-1.0320	0.1627	0.000	-1.3512	-0.7128
Constant	3501.8350	1253.9440	0.005	1042.3180	5961.3530

TABLE 9-23. OLS Regression Results – Grade 10, Science

Grade	10
Test	Science
Number of Observations	1,630
R-Squared	0.6742
Adjusted R-Squared	0.6689

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	2.3712	1.1464	0.039	0.1227	4.6197
Exp. by Funct. – Instruction Related	2.8513	1.4083	0.043	0.0891	5.6135
Exp. by Funct. – Instructional Leadership	4.0387	1.6823	0.016	0.7391	7.3384
Exp. by Funct. – Other	2.2048	1.1530	0.056	-0.0567	4.4663
Exp. by Funct. – School Leadership	1.6396	1.1819	0.166	-0.6787	3.9578
Exp. by Funct. – Supportive Services	1.4188	1.2424	0.254	-1.0180	3.8556
Exp. by Funct. – Total Operating Funds	-2.1949	1.1417	0.055	-4.4342	0.0444
Student Dem. – Percent African-American	-25.5544	17.4125	0.142	-59.7080	8.5992
Student Dem. – Percent Asian-American	-22.7685	17.4311	0.192	-56.9587	11.4216
Student Dem. – Percent Hispanic	-25.2243	17.4163	0.148	-59.3853	8.9368
Student Dem. – Percent Native American	-26.8571	17.4679	0.124	-61.1194	7.4052
Student Dem. – Percent Pacific Islander	-27.8072	17.4702	0.112	-62.0740	6.4596
Student Dem. – Percent Two-race	-24.1659	17.4779	0.167	-58.4479	10.1161
Student Dem. – Percent White	-24.9303	17.4140	0.152	-59.0868	9.2263
Campus Type – Charter Campus	-9.2906	6.3417	0.143	-21.7296	3.1483
Campus Type – Rural Campus	-24.4161	4.3725	0.000	-32.9924	-15.8397
Campus Type – Suburban Campus	-6.9238	4.1753	0.097	-15.1134	1.2658
Teacher Dem. – Avg. Teacher Experience	-0.8857	0.4226	0.036	-1.7147	-0.0568
Student Dem. – Percent At-risk	-2.0483	0.0866	0.000	-2.2181	-1.8784
Student Dem. – Percent Bilingual	1.1789	1.5692	0.453	-1.8990	4.2569
Student Dem. – Percent Career & Technical Ed.	-0.0126	0.0563	0.823	-0.1230	0.0978
Student Dem. – Percent DAEP	-0.3608	0.5734	0.529	-1.4855	0.7639
Student Dem. – Percent Econ. Disadvantaged	-0.2302	0.0853	0.007	-0.3975	-0.0628
Student Dem. – Percent GATE	1.6666	0.1942	0.000	1.2856	2.0475
Student Dem. – Percent LEP	-1.2611	1.5436	0.414	-4.2888	1.7666
Student Dem. – Percent Special Ed.	-0.9657	0.2326	0.000	-1.4219	-0.5094
Constant	4828.3560	1741.8120	0.006	1411.8870	8244.8240

TABLE 9-24. OLS Regression Results – Grade 11, History

Grade	11
Test	History
Number of Observations	1,596
R-Squared	0.5906
Adjusted R-Squared	0.5838

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	1.7561	1.0568	0.097	-0.3168	3.8290
Exp. by Funct. – Instruction Related	2.5498	1.3174	0.053	-0.0343	5.1340
Exp. by Funct. – Instructional Leadership	0.9880	1.5939	0.535	-2.1384	4.1144
Exp. by Funct. – Other	1.4751	1.0624	0.165	-0.6087	3.5589
Exp. by Funct. – School Leadership	1.0745	1.0959	0.327	-1.0750	3.2240
Exp. by Funct. – Supportive Services	0.5959	1.1675	0.610	-1.6941	2.8858
Exp. by Funct. – Total Operating Funds	-1.6148	1.0526	0.125	-3.6795	0.4499
Student Dem. – Percent African-American	-2.8712	16.2296	0.860	-34.7052	28.9628
Student Dem. – Percent Asian-American	-0.9460	16.2427	0.954	-32.8057	30.9136
Student Dem. – Percent Hispanic	-2.8998	16.2331	0.858	-34.7406	28.9410
Student Dem. – Percent Native American	-4.0707	16.2805	0.803	-36.0045	27.8632
Student Dem. – Percent Pacific Islander	-3.7052	16.2985	0.820	-35.6742	28.2639
Student Dem. – Percent Two-race	-0.7872	16.2885	0.961	-32.7366	31.1622
Student Dem. – Percent White	-2.7847	16.2304	0.864	-34.6203	29.0509
Campus Type – Charter Campus	-22.7115	6.0848	0.000	-34.6467	-10.7763
Campus Type – Rural Campus	-22.5959	4.0200	0.000	-30.4809	-14.7108
Campus Type – Suburban Campus	1.4292	3.8649	0.712	-6.1518	9.0101
Teacher Dem. – Avg. Teacher Experience	-1.0553	0.4120	0.011	-1.8634	-0.2471
Student Dem. – Percent At-risk	-1.4236	0.0847	0.000	-1.5897	-1.2575
Student Dem. – Percent Bilingual	0.5489	1.4722	0.709	-2.3387	3.4366
Student Dem. – Percent Career & Technical Ed.	-0.0943	0.0524	0.072	-0.1972	0.0085
Student Dem. – Percent DAEP	-0.1431	0.5183	0.783	-1.1597	0.8736
Student Dem. – Percent Econ. Disadvantaged	-0.4424	0.0854	0.000	-0.6099	-0.2748
Student Dem. – Percent GATE	1.2319	0.1792	0.000	0.8804	1.5835
Student Dem. – Percent LEP	-0.5463	1.4467	0.706	-3.3840	2.2913
Student Dem. – Percent Special Ed.	-0.4708	0.2272	0.038	-0.9164	-0.0251
Constant	2786.1530	1623.3550	0.086	-398.0214	5970.3270

TABLE 9-25. OLS Regression Results – Grade 11, Math

Grade	11
Test	Math
Number of Observations	1,592
R-Squared	0.6503
Adjusted R-Squared	0.6445

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	1.8336	1.0967	0.095	-0.3176	3.9848
Exp. by Funct. – Instruction Related	1.7075	1.3682	0.212	-0.9761	4.3912
Exp. by Funct. – Instructional Leadership	0.1419	1.6564	0.932	-3.1071	3.3908
Exp. by Funct. – Other	1.5454	1.1020	0.161	-0.6162	3.7071
Exp. by Funct. – School Leadership	0.7378	1.1390	0.517	-1.4963	2.9720
Exp. by Funct. – Supportive Services	1.0669	1.2133	0.379	-1.3129	3.4467
Exp. by Funct. – Total Operating Funds	-1.5815	1.0920	0.148	-3.7235	0.5605
Student Dem. – Percent African-American	-1.0937	16.8701	0.948	-34.1842	31.9967
Student Dem. – Percent Asian-American	0.6483	16.8846	0.969	-32.4706	33.7671
Student Dem. – Percent Hispanic	-0.9360	16.8740	0.956	-34.0340	32.1620
Student Dem. – Percent Native American	-1.3687	16.9232	0.936	-34.5633	31.8259
Student Dem. – Percent Pacific Islander	-3.4405	16.9387	0.839	-36.6655	29.7845
Student Dem. – Percent Two-race	-0.0570	16.9288	0.997	-33.2626	33.1486
Student Dem. – Percent White	-0.9371	16.8712	0.956	-34.0295	32.1554
Campus Type – Charter Campus	-9.1404	6.3259	0.149	-21.5484	3.2677
Campus Type – Rural Campus	-12.1621	4.1831	0.004	-20.3672	-3.9570
Campus Type – Suburban Campus	1.2622	4.0102	0.753	-6.6037	9.1280
Teacher Dem. – Avg. Teacher Experience	-0.4514	0.4279	0.292	-1.2908	0.3879
Student Dem. – Percent At-risk	-2.0789	0.0877	0.000	-2.2509	-1.9070
Student Dem. – Percent Bilingual	0.3218	1.5643	0.837	-2.7466	3.3902
Student Dem. – Percent Career & Technical Ed.	0.0228	0.0545	0.676	-0.0842	0.1298
Student Dem. – Percent DAEP	-1.0411	0.5411	0.055	-2.1024	0.0202
Student Dem. – Percent Econ. Disadvantaged	-0.2208	0.0885	0.013	-0.3944	-0.0471
Student Dem. – Percent GATE	1.6560	0.1861	0.000	1.2910	2.0210
Student Dem. – Percent LEP	0.4166	1.5389	0.787	-2.6019	3.4350
Student Dem. – Percent Special Ed.	-0.9212	0.2521	0.000	-1.4156	-0.4267
Constant	2476.0350	1687.4380	0.142	-833.8429	5785.9140

TABLE 9-26. OLS Regression Results – Grade 11, Reading

Grade	11
Test	Reading
Number of Observations	1,596
R-Squared	0.6312
Adjusted R-Squared	0.6250

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.1411	0.8266	0.864	-1.4802	1.7625
Exp. by Funct. – Instruction Related	0.2045	1.0328	0.843	-1.8213	2.2303
Exp. by Funct. – Instructional Leadership	-1.8263	1.2340	0.139	-4.2468	0.5942
Exp. by Funct. – Other	-0.1071	0.8298	0.897	-1.7347	1.5204
Exp. by Funct. – School Leadership	0.1563	0.8517	0.854	-1.5143	1.8269
Exp. by Funct. – Supportive Services	-0.9446	0.9119	0.300	-2.7333	0.8442
Exp. by Funct. – Total Operating Funds	-0.0777	0.8228	0.925	-1.6917	1.5363
Student Dem. – Percent African-American	4.4998	12.7278	0.724	-20.4656	29.4651
Student Dem. – Percent Asian-American	5.3407	12.7386	0.675	-19.6457	30.3271
Student Dem. – Percent Hispanic	4.6946	12.7308	0.712	-20.2766	29.6658
Student Dem. – Percent Native American	4.1632	12.7683	0.744	-20.8816	29.2080
Student Dem. – Percent Pacific Islander	5.5273	12.7829	0.666	-19.5460	30.6006
Student Dem. – Percent Two-race	5.4455	12.7712	0.670	-19.6048	30.4959
Student Dem. – Percent White	4.8147	12.7287	0.705	-20.1523	29.7817
Campus Type – Charter Campus	-2.9353	4.7410	0.536	-12.2346	6.3640
Campus Type – Rural Campus	-1.9711	3.1420	0.531	-8.1340	4.1919
Campus Type – Suburban Campus	3.4292	3.0222	0.257	-2.4987	9.3571
Teacher Dem. – Avg. Teacher Experience	0.6693	0.3223	0.038	0.0371	1.3014
Student Dem. – Percent At-risk	-1.1653	0.0644	0.000	-1.2917	-1.0390
Student Dem. – Percent Bilingual	1.5916	1.1508	0.167	-0.6656	3.8489
Student Dem. – Percent Career & Technical Ed.	-0.0534	0.0412	0.195	-0.1341	0.0274
Student Dem. – Percent DAEP	-0.3886	0.4064	0.339	-1.1858	0.4085
Student Dem. – Percent Econ. Disadvantaged	-0.3603	0.0662	0.000	-0.4903	-0.2304
Student Dem. – Percent GATE	1.0336	0.1404	0.000	0.7583	1.3090
Student Dem. – Percent LEP	-1.7782	1.1317	0.116	-3.9981	0.4416
Student Dem. – Percent Special Ed.	-1.0225	0.1732	0.000	-1.3623	-0.6828
Constant	1900.6650	1273.1080	0.136	-596.5065	4397.8370

TABLE 9-27. OLS Regression Results – Grade 11, Science

Grade	11
Test	Science
Number of Observations	1,594
R-Squared	0.6481
Adjusted R-Squared	0.6422

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	1.5965	0.9613	0.097	-0.2891	3.4821
Exp. by Funct. – Instruction Related	1.6429	1.1987	0.171	-0.7084	3.9942
Exp. by Funct. – Instructional Leadership	1.2019	1.4510	0.408	-1.6443	4.0481
Exp. by Funct. – Other	1.3545	0.9661	0.161	-0.5404	3.2495
Exp. by Funct. – School Leadership	1.2498	0.9985	0.211	-0.7088	3.2083
Exp. by Funct. – Supportive Services	0.7528	1.0634	0.479	-1.3332	2.8387
Exp. by Funct. – Total Operating Funds	-1.4675	0.9573	0.126	-3.3452	0.4103
Student Dem. – Percent African-American	3.9703	14.7662	0.788	-24.9933	32.9338
Student Dem. – Percent Asian-American	5.4325	14.7780	0.713	-23.5543	34.4193
Student Dem. – Percent Hispanic	4.1620	14.7693	0.778	-24.8077	33.1318
Student Dem. – Percent Native American	3.3234	14.8134	0.823	-25.7328	32.3797
Student Dem. – Percent Pacific Islander	2.2181	14.8293	0.881	-26.8692	31.3054
Student Dem. – Percent Two-race	6.4963	14.8165	0.661	-22.5659	35.5585
Student Dem. – Percent White	4.2668	14.7669	0.773	-24.6982	33.2318
Campus Type – Charter Campus	-15.0557	5.5386	0.007	-25.9196	-4.1917
Campus Type – Rural Campus	-14.8050	3.6610	0.000	-21.9859	-7.6240
Campus Type – Suburban Campus	1.0918	3.5146	0.756	-5.8020	7.9855
Teacher Dem. – Avg. Teacher Experience	-0.7391	0.3760	0.050	-1.4765	-0.0016
Student Dem. – Percent At-risk	-1.5613	0.0771	0.000	-1.7126	-1.4101
Student Dem. – Percent Bilingual	2.3042	1.3716	0.093	-0.3861	4.9945
Student Dem. – Percent Career & Technical Ed.	-0.0849	0.0478	0.076	-0.1786	0.0089
Student Dem. – Percent DAEP	-0.5918	0.4740	0.212	-1.5214	0.3379
Student Dem. – Percent Econ. Disadvantaged	-0.4306	0.0776	0.000	-0.5829	-0.2783
Student Dem. – Percent GATE	1.5081	0.1631	0.000	1.1881	1.8280
Student Dem. – Percent LEP	-2.0934	1.3492	0.121	-4.7398	0.5530
Student Dem. – Percent Special Ed.	-0.5899	0.2113	0.005	-1.0044	-0.1755
Constant	1959.3420	1476.9600	0.185	-937.6840	4856.3690

TABLE 10. Statistically Significant Logistic Regression Results

Group	Variable	Type of Schools	Regr. Coef.
Expenditures by Function	Instruction	No Racial/Ethnic Majority	0.0264 **
		Majority White	-0.0011 ***
		Majority Latino	-0.0014 *
	Instruction Related	Majority White	0.0321 *
		Majority Economically Disadvantaged	-0.0029 **
		Majority African American and Latino	-0.0099 *
	Instructional Leadership	No Racial/Ethnic Majority	0.0657 **
		Majority At-Risk	-0.0034 **
		Majority Latino	-0.0068 *
	Other	No Racial/Ethnic Majority	0.0507 **
		Majority White	0.0044 **
	School Leadership	No Racial/Ethnic Majority	0.0325 **
	Supportive Services	No Racial/Ethnic Majority	0.0414 **
		Majority White	0.0252 *
	Total Operating Funds	Majority White	0.0030 ***
		No Racial/Ethnic Majority	-0.0347 **
Campus Type	Charter Campus	Majority Latino	0.0419 *
	Suburban Campus	No Racial/Ethnic Majority	0.0151 **
		Majority African American and Latino	0.0149 *
		Majority Economically Disadvantaged	-0.0072 **
Student Demographics	Percent African-American	Majority At-Risk	-0.0774 *
	Percent Asian-American	Majority At-Risk	-0.0456 **
	Percent Econ. Disadvantaged	Majority ELL	-0.0006 **
	Percent Hispanic	Majority At-Risk	-0.0676 *
	Percent Native American	Majority At-Risk	-0.0426 **
	Percent Pacific Islander	Majority At-Risk	-0.0869 *
	Percent Two-race	Majority At-Risk	-0.0211 **
	Percent White	Majority At-Risk	-0.0869 *

TABLE 11-1. Logistic Regression Results – Majority African-American

Schools Selected	Majority African-American
Number of Observations	306
Pseudo R-Squared	0.3556

Variable	**Coef.**	**Std. Err.**	**P>|t|**	**Confidence Interval**	
				Low	**High**
Exp. by Funct. – Instruction	0.1735	0.4654	0.709	-0.7387	1.0857
Exp. by Funct. – Instruction Related	-0.0728	0.5574	0.896	-1.1653	1.0197
Exp. by Funct. – Instructional Leadership	0.2510	0.5773	0.664	-0.8804	1.3824
Exp. by Funct. – Other	0.0891	0.4679	0.849	-0.8281	1.0062
Exp. by Funct. – School Leadership	0.2582	0.4746	0.586	-0.6721	1.1884
Exp. by Funct. – Supportive Services	-0.2775	0.4653	0.551	-1.1894	0.6344
Exp. by Funct. – Total Operating Funds	-0.1968	0.4604	0.669	-1.0991	0.7056
Student Dem. – Percent African-American	2.9806	3.6259	0.411	-4.1261	10.0873
Student Dem. – Percent Asian-American	2.9093	3.6159	0.421	-4.1778	9.9964
Student Dem. – Percent Hispanic	3.0011	3.6234	0.408	-4.1006	10.1029
Student Dem. – Percent Native American	2.9847	3.6476	0.413	-4.1644	10.1338
Student Dem. – Percent Pacific Islander	2.1684	3.9469	0.583	-5.5673	9.9042
Student Dem. – Percent Two-race	3.2202	3.5969	0.371	-3.8296	10.2699
Student Dem. – Percent White	2.9414	3.6216	0.417	-4.1568	10.0396
Campus Type – Charter Campus	-3.3460	1.5274	0.028	-6.3397	-0.3522
Campus Type – Rural Campus			(*omitted*)		
Campus Type – Suburban Campus	-0.3847	0.8836	0.663	-2.1166	1.3472
Teacher Dem. – Avg. Teacher Experience	0.1276	0.1081	0.238	-0.0843	0.3395
Student Dem. – Percent At-risk	-0.0773	0.0235	0.001	-0.1234	-0.0311
Student Dem. – Percent Bilingual	-0.1522	0.0782	0.052	-0.3056	0.0011
Student Dem. – Percent Career & Technical Ed.	0.0315	0.0235	0.179	-0.0145	0.0775
Student Dem. – Percent DAEP	-1.4554	0.6780	0.032	-2.7843	-0.1265
Student Dem. – Percent Econ. Disadvantaged	0.0312	0.0332	0.348	-0.0340	0.0963
Student Dem. – Percent GATE	0.0667	0.0537	0.214	-0.0386	0.1720
Student Dem. – Percent LEP	0.1653	0.0925	0.074	-0.0161	0.3467
Student Dem. – Percent Special Ed.	0.1296	0.0913	0.156	-0.0494	0.3086
Constant	-298.5459	361.8398	0.409	-1,007.7390	410.6471

TABLE 11-2. Logistic Regression Results – Majority Latino

Schools Selected	Majority Latino
Number of Observations	3,232
Pseudo R-Squared	0.1831

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-0.0014	0.0187	0.939	-0.0381	0.0352
Exp. by Funct. – Instruction Related	-0.0316	0.0518	0.542	-0.1332	0.0699
Exp. by Funct. – Instructional Leadership	-0.0068	0.1063	0.949	-0.2152	0.2016
Exp. by Funct. – Other	0.0076	0.0222	0.730	-0.0358	0.0511
Exp. by Funct. – School Leadership	-0.0083	0.0342	0.808	-0.0754	0.0587
Exp. by Funct. – Supportive Services	0.0280	0.0317	0.377	-0.0342	0.0902
Exp. by Funct. – Total Operating Funds	0.0058	0.0182	0.750	-0.0299	0.0415
Student Dem. – Percent African-American	0.2245	0.9049	0.804	-1.5491	1.9981
Student Dem. – Percent Asian-American	0.2762	0.9047	0.760	-1.4970	2.0494
Student Dem. – Percent Hispanic	0.2417	0.9048	0.789	-1.5316	2.0150
Student Dem. – Percent Native American	0.2153	0.9063	0.812	-1.5610	1.9916
Student Dem. – Percent Pacific Islander	0.5869	0.9451	0.535	-1.2654	2.4392
Student Dem. – Percent Two-race	0.3885	0.9099	0.669	-1.3949	2.1719
Student Dem. – Percent White	0.2214	0.9046	0.807	-1.5516	1.9944
Campus Type – Charter Campus	0.0419	0.3632	0.908	-0.6701	0.7538
Campus Type – Rural Campus	-0.6366	0.2388	0.008	-1.1047	-0.1685
Campus Type – Suburban Campus	0.1341	0.1525	0.379	-0.1648	0.4330
Teacher Dem. – Avg. Teacher Experience	0.0172	0.0225	0.444	-0.0269	0.0613
Student Dem. – Percent At-risk	-0.0410	0.0059	0.000	-0.0526	-0.0293
Student Dem. – Percent Bilingual	-0.0114	0.0143	0.427	-0.0395	0.0167
Student Dem. – Percent Career & Technical Ed.	-0.0107	0.0052	0.041	-0.0209	-0.0004
Student Dem. – Percent DAEP	-0.8271	0.1229	0.000	-1.0681	-0.5862
Student Dem. – Percent Econ. Disadvantaged	-0.0059	0.0043	0.167	-0.0144	0.0025
Student Dem. – Percent GATE	0.0483	0.0109	0.000	0.0268	0.0697
Student Dem. – Percent LEP	0.0283	0.0150	0.059	-0.0010	0.0576
Student Dem. – Percent Special Ed.	-0.0680	0.0228	0.003	-0.1126	-0.0233
Constant	-23.6581	90.4644	0.794	-200.9652	153.6489

TABLE 11-3. Logistic Regression Results – Majority White

Schools Selected	Majority White
Number of Observations	2,599
Pseudo R-Squared	0.4102

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	-0.0011	0.2782	0.997	-0.5463	0.5441
Exp. by Funct. – Instruction Related	0.0321	0.2828	0.910	-0.5223	0.5864
Exp. by Funct. – Instructional Leadership	0.2264	0.3042	0.457	-0.3698	0.8227
Exp. by Funct. – Other	0.0044	0.2781	0.987	-0.5406	0.5494
Exp. by Funct. – School Leadership	-0.0580	0.2832	0.838	-0.6130	0.4971
Exp. by Funct. – Supportive Services	0.0252	0.2815	0.929	-0.5265	0.5770
Exp. by Funct. – Total Operating Funds	0.0030	0.2779	0.991	-0.5418	0.5477
Student Dem. – Percent African-American	0.3583	0.8374	0.669	-1.2830	1.9996
Student Dem. – Percent Asian-American	0.4582	0.8372	0.584	-1.1826	2.0991
Student Dem. – Percent Hispanic	0.3998	0.8373	0.633	-1.2412	2.0408
Student Dem. – Percent Native American	0.4146	0.8444	0.623	-1.2403	2.0696
Student Dem. – Percent Pacific Islander	0.5607	0.8667	0.518	-1.1380	2.2593
Student Dem. – Percent Two-race	0.4355	0.8391	0.604	-1.2091	2.0801
Student Dem. – Percent White	0.4206	0.8373	0.615	-1.2204	2.0617
Campus Type – Charter Campus	-1.5851	0.5361	0.003	-2.6357	-0.5344
Campus Type – Rural Campus	-0.4686	0.2216	0.034	-0.9029	-0.0343
Campus Type – Suburban Campus	-0.3788	0.1883	0.044	-0.7479	-0.0097
Teacher Dem. – Avg. Teacher Experience	0.0490	0.0231	0.034	0.0037	0.0943
Student Dem. – Percent At-risk	-0.0347	0.0066	0.000	-0.0476	-0.0219
Student Dem. – Percent Bilingual	0.0300	0.0550	0.585	-0.0778	0.1377
Student Dem. – Percent Career & Technical Ed.	-0.0323	0.0049	0.000	-0.0420	-0.0226
Student Dem. – Percent DAEP	-0.6129	0.1103	0.000	-0.8292	-0.3966
Student Dem. – Percent Econ. Disadvantaged	-0.0427	0.0050	0.000	-0.0526	-0.0328
Student Dem. – Percent GATE	-0.0027	0.0105	0.794	-0.0232	0.0177
Student Dem. – Percent LEP	-0.0159	0.0587	0.786	-0.1309	0.0991
Student Dem. – Percent Special Ed.	-0.0768	0.0225	0.001	-0.1208	-0.0328
Constant	-39.3618	83.7245	0.638	-203.4588	124.7352

TABLE 11-4. Logistic Regression Results – No Racial/Ethnic Majority

Schools Selected	No Racial/Ethnic Majority
Number of Observations	1,306
Pseudo R-Squared	0.3624

Variable	**Coef.**	**Std. Err.**	**P>|t|**	**Confidence Interval**	
				Low	**High**
Exp. by Funct. – Instruction	0.0264	1.0938	0.981	-2.1174	2.1703
Exp. by Funct. – Instruction Related	0.1547	1.0947	0.888	-1.9909	2.3003
Exp. by Funct. – Instructional Leadership	0.0657	1.1079	0.953	-2.1058	2.2372
Exp. by Funct. – Other	0.0507	1.0943	0.963	-2.0942	2.1955
Exp. by Funct. – School Leadership	0.0325	1.0945	0.976	-2.1128	2.1777
Exp. by Funct. – Supportive Services	0.0414	1.0960	0.970	-2.1067	2.1896
Exp. by Funct. – Total Operating Funds	-0.0347	1.0935	0.975	-2.1779	2.1086
Student Dem. – Percent African-American	1.2095	1.2818	0.345	-1.3027	3.7217
Student Dem. – Percent Asian-American	1.2440	1.2811	0.332	-1.2669	3.7549
Student Dem. – Percent Hispanic	1.2246	1.2814	0.339	-1.2870	3.7362
Student Dem. – Percent Native American	1.3375	1.2814	0.297	-1.1741	3.8490
Student Dem. – Percent Pacific Islander	1.3536	1.2936	0.295	-1.1818	3.8891
Student Dem. – Percent Two-race	1.2318	1.2843	0.338	-1.2854	3.7490
Student Dem. – Percent White	1.2281	1.2812	0.338	-1.2830	3.7393
Campus Type – Charter Campus	0.2573	0.7273	0.724	-1.1682	1.6827
Campus Type – Rural Campus	-0.5375	0.4014	0.181	-1.3242	0.2492
Campus Type – Suburban Campus	0.0151	0.2559	0.953	-0.4865	0.5168
Teacher Dem. – Avg. Teacher Experience	0.0835	0.0363	0.021	0.0123	0.1547
Student Dem. – Percent At-risk	-0.0264	0.0098	0.007	-0.0456	-0.0072
Student Dem. – Percent Bilingual	0.0357	0.0439	0.416	-0.0503	0.1216
Student Dem. – Percent Career & Technical Ed.	-0.0157	0.0099	0.113	-0.0350	0.0037
Student Dem. – Percent DAEP	-1.2173	0.2283	0.000	-1.6647	-0.7699
Student Dem. – Percent Econ. Disadvantaged	-0.0318	0.0089	0.000	-0.0493	-0.0144
Student Dem. – Percent GATE	0.0153	0.0094	0.103	-0.0031	0.0337
Student Dem. – Percent LEP	-0.0107	0.0457	0.814	-0.1003	0.0788
Student Dem. – Percent Special Ed.	-0.0549	0.0334	0.100	-0.1203	0.0105
Constant	-121.9797	128.1583	0.341	-373.1652	129.2059

TABLE 11-5. Logistic Regression Results – Majority African-American and Latino

Schools Selected	Majority African-American and Latino
Number of Observations	4,170
Pseudo R-Squared	0.2027

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.0312	0.1081	0.773	-0.1806	0.2430
Exp. by Funct. – Instruction Related	-0.0099	0.1123	0.930	-0.2300	0.2102
Exp. by Funct. – Instructional Leadership	0.0795	0.1401	0.570	-0.1951	0.3540
Exp. by Funct. – Other	0.0334	0.1101	0.761	-0.1823	0.2492
Exp. by Funct. – School Leadership	0.0471	0.1143	0.681	-0.1770	0.2711
Exp. by Funct. – Supportive Services	0.0949	0.1195	0.427	-0.1394	0.3292
Exp. by Funct. – Total Operating Funds	-0.0272	0.1075	0.800	-0.2379	0.1835
Student Dem. – Percent African-American	0.3092	0.7815	0.692	-1.2226	1.8410
Student Dem. – Percent Asian-American	0.3477	0.7814	0.656	-1.1839	1.8792
Student Dem. – Percent Hispanic	0.3222	0.7815	0.680	-1.2095	1.8540
Student Dem. – Percent Native American	0.3454	0.7817	0.659	-1.1868	1.8776
Student Dem. – Percent Pacific Islander	0.4010	0.7897	0.612	-1.1468	1.9488
Student Dem. – Percent Two-race	0.3717	0.7837	0.635	-1.1644	1.9078
Student Dem. – Percent White	0.3051	0.7814	0.696	-1.2264	1.8365
Campus Type – Charter Campus	0.0522	0.3370	0.877	-0.6083	0.7126
Campus Type – Rural Campus	-0.9865	0.2286	0.000	-1.4346	-0.5384
Campus Type – Suburban Campus	0.0149	0.1352	0.912	-0.2501	0.2799
Teacher Dem. – Avg. Teacher Experience	0.0355	0.0201	0.077	-0.0039	0.0749
Student Dem. – Percent At-risk	-0.0344	0.0055	0.000	-0.0451	-0.0237
Student Dem. – Percent Bilingual	-0.0055	0.0136	0.689	-0.0322	0.0213
Student Dem. – Percent Career & Technical Ed.	-0.0072	0.0046	0.118	-0.0162	0.0018
Student Dem. – Percent DAEP	-0.8763	0.1071	0.000	-1.0861	-0.6665
Student Dem. – Percent Econ. Disadvantaged	-0.0094	0.0038	0.013	-0.0168	-0.0020
Student Dem. – Percent GATE	0.0315	0.0083	0.000	0.0152	0.0477
Student Dem. – Percent LEP	0.0179	0.0142	0.210	-0.0101	0.0458
Student Dem. – Percent Special Ed.	-0.0622	0.0199	0.002	-0.1012	-0.0231
Constant	-31.8403	78.1399	0.684	-184.9917	121.3111

TABLE 11-6. Logistic Regression Results – Majority At-Risk

Schools Selected	Majority At-Risk
Number of Observations	2,726
Pseudo R-Squared	0.1611

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval	
				Low	High
Exp. by Funct. – Instruction	0.0750	0.1203	0.533	-0.1608	0.3108
Exp. by Funct. – Instruction Related	0.0479	0.1262	0.704	-0.1994	0.2951
Exp. by Funct. – Instructional Leadership	-0.0034	0.1668	0.984	-0.3304	0.3236
Exp. by Funct. – Other	0.0801	0.1221	0.512	-0.1592	0.3194
Exp. by Funct. – School Leadership	0.1196	0.1302	0.358	-0.1356	0.3747
Exp. by Funct. – Supportive Services	0.0514	0.1313	0.696	-0.2059	0.3086
Exp. by Funct. – Total Operating Funds	-0.0666	0.1187	0.575	-0.2994	0.1661
Student Dem. – Percent African-American	-0.0774	0.9747	0.937	-1.9879	1.8330
Student Dem. – Percent Asian-American	-0.0456	0.9749	0.963	-1.9564	1.8652
Student Dem. – Percent Hispanic	-0.0676	0.9747	0.945	-1.9781	1.8428
Student Dem. – Percent Native American	-0.0426	0.9750	0.965	-1.9534	1.8683
Student Dem. – Percent Pacific Islander	-0.0869	1.0015	0.931	-2.0498	1.8761
Student Dem. – Percent Two-race	-0.0211	0.9778	0.983	-1.9376	1.8953
Student Dem. – Percent White	-0.0869	0.9748	0.929	-1.9974	1.8236
Campus Type – Charter Campus	-0.0828	0.4368	0.850	-0.9390	0.7734
Campus Type – Rural Campus	-0.9527	0.2972	0.001	-1.5353	-0.3702
Campus Type – Suburban Campus	0.0922	0.1629	0.571	-0.2271	0.4116
Teacher Dem. – Avg. Teacher Experience	0.0355	0.0242	0.142	-0.0119	0.0829
Student Dem. – Percent At-risk	-0.0330	0.0067	0.000	-0.0461	-0.0199
Student Dem. – Percent Bilingual	-0.0173	0.0150	0.248	-0.0467	0.0121
Student Dem. – Percent Career & Technical Ed.	-0.0125	0.0056	0.025	-0.0233	-0.0016
Student Dem. – Percent DAEP	-0.5447	0.1135	0.000	-0.7672	-0.3223
Student Dem. – Percent Econ. Disadvantaged	-0.0189	0.0046	0.000	-0.0280	-0.0099
Student Dem. – Percent GATE	0.0588	0.0122	0.000	0.0349	0.0827
Student Dem. – Percent LEP	0.0282	0.0156	0.071	-0.0024	0.0588
Student Dem. – Percent Special Ed.	-0.0519	0.0247	0.036	-0.1003	-0.0035
Constant	7.5051	97.4524	0.939	-183.4980	198.5082

TABLE 11-7. Logistic Regression Results – Majority Economically Disadvantaged

Schools Selected	Majority Economically Disadvantaged
Number of Observations	4,325
Pseudo R-Squared	0.1726

Variable	Coef.	Std. Err.	P>|t|	Confidence Interval Low	High
Exp. by Funct. – Instruction	0.0344	0.0856	0.687	-0.1332	0.2021
Exp. by Funct. – Instruction Related	-0.0029	0.0910	0.974	-0.1813	0.1754
Exp. by Funct. – Instructional Leadership	0.0685	0.1247	0.583	-0.1759	0.3130
Exp. by Funct. – Other	0.0348	0.0868	0.688	-0.1352	0.2049
Exp. by Funct. – School Leadership	0.0456	0.0948	0.630	-0.1402	0.2315
Exp. by Funct. – Supportive Services	0.0843	0.0987	0.393	-0.1091	0.2777
Exp. by Funct. – Total Operating Funds	-0.0295	0.0851	0.729	-0.1963	0.1374
Student Dem. – Percent African-American	0.2231	0.7676	0.771	-1.2814	1.7276
Student Dem. – Percent Asian-American	0.2605	0.7674	0.734	-1.2435	1.7645
Student Dem. – Percent Hispanic	0.2357	0.7676	0.759	-1.2687	1.7402
Student Dem. – Percent Native American	0.2590	0.7674	0.736	-1.2451	1.7631
Student Dem. – Percent Pacific Islander	0.3170	0.7754	0.683	-1.2028	1.8368
Student Dem. – Percent Two-race	0.2565	0.7696	0.739	-1.2518	1.7648
Student Dem. – Percent White	0.2206	0.7675	0.774	-1.2836	1.7249
Campus Type – Charter Campus	0.0424	0.3312	0.898	-0.6068	0.6915
Campus Type – Rural Campus	-0.9276	0.2131	0.000	-1.3452	-0.5100
Campus Type – Suburban Campus	-0.0072	0.1322	0.957	-0.2663	0.2520
Teacher Dem. – Avg. Teacher Experience	0.0355	0.0198	0.072	-0.0032	0.0743
Student Dem. – Percent At-risk	-0.0328	0.0053	0.000	-0.0432	-0.0223
Student Dem. – Percent Bilingual	-0.0055	0.0135	0.683	-0.0319	0.0209
Student Dem. – Percent Career & Technical Ed.	-0.0076	0.0047	0.105	-0.0167	0.0016
Student Dem. – Percent DAEP	-0.7934	0.1007	0.000	-0.9907	-0.5960
Student Dem. – Percent Econ. Disadvantaged	-0.0092	0.0038	0.016	-0.0166	-0.0017
Student Dem. – Percent GATE	0.0335	0.0084	0.000	0.0170	0.0500
Student Dem. – Percent LEP	0.0175	0.0141	0.214	-0.0101	0.0451
Student Dem. – Percent Special Ed.	-0.0595	0.0194	0.002	-0.0976	-0.0214
Constant	-23.3162	76.7504	0.761	-173.7443	127.1119

TABLE 11-8. Logistic Regression Results – Majority English Language Learner

Schools Selected	Majority English Language Learners
Number of Observations	624
Pseudo R-Squared	0.1239

Variable	**Coef.**	**Std. Err.**	**P>|t|**	**Confidence Interval**	
				Low	**High**
Exp. by Funct. – Instruction	4.4027	18.6962	0.814	-32.2412	41.0466
Exp. by Funct. – Instruction Related	3.8660	18.7007	0.836	-32.7866	40.5186
Exp. by Funct. – Instructional Leadership	4.4455	18.7115	0.812	-32.2283	41.1193
Exp. by Funct. – Other	4.3734	18.6956	0.815	-32.2692	41.0161
Exp. by Funct. – School Leadership	4.3089	18.6928	0.818	-32.3283	40.9461
Exp. by Funct. – Supportive Services	4.2879	18.6864	0.819	-32.3367	40.9125
Exp. by Funct. – Total Operating Funds	-4.3381	18.6967	0.817	-40.9829	32.3068
Student Dem. – Percent African-American	2.5789	2.1078	0.221	-1.5523	6.7100
Student Dem. – Percent Asian-American	2.5778	2.1034	0.220	-1.5447	6.7003
Student Dem. – Percent Hispanic	2.5804	2.1063	0.221	-1.5479	6.7086
Student Dem. – Percent Native American	2.0705	2.1173	0.328	-2.0793	6.2202
Student Dem. – Percent Pacific Islander	0.3881	2.7526	0.888	-5.0070	5.7831
Student Dem. – Percent Two-race	3.0915	2.1506	0.151	-1.1235	7.3066
Student Dem. – Percent White	2.5993	2.1053	0.217	-1.5271	6.7257
Campus Type – Charter Campus	-1.1451	1.2094	0.344	-3.5154	1.2253
Campus Type – Rural Campus	0.2245	0.6622	0.735	-1.0734	1.5224
Campus Type – Suburban Campus	0.4761	0.3581	0.184	-0.2259	1.1781
Teacher Dem. – Avg. Teacher Experience	0.0238	0.0524	0.650	-0.0789	0.1266
Student Dem. – Percent At-risk	-0.0844	0.0288	0.003	-0.1408	-0.0280
Student Dem. – Percent Bilingual	-0.0767	0.0335	0.022	-0.1425	-0.0110
Student Dem. – Percent Career & Technical Ed.			*(omitted)*		
Student Dem. – Percent DAEP	-1.0198	0.6009	0.090	-2.1976	0.1579
Student Dem. – Percent Econ. Disadvantaged	-0.0006	0.0108	0.954	-0.0218	0.0205
Student Dem. – Percent GATE	0.0454	0.0295	0.123	-0.0124	0.1031
Student Dem. – Percent LEP	0.1331	0.0436	0.002	0.0475	0.2186
Student Dem. – Percent Special Ed.	-0.0544	0.0659	0.409	-0.1836	0.0748
Constant	-259.6827	210.4050	0.217	-672.0688	152.7035

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